# South African Medical Journal

Organ of the Medical Association of South Africa

Incorporating the *South African Medical Record* and the *Medical Journal of South Africa*

Registered at the General Post Office as a newspaper

# S.-A. Tydskrif vir Geneeskunde

Blad van die Mediese Vereniging van Suid-Afrika

Waarby ingelyf is die *South African Medical Record* and the *Medical Journal of South Africa*

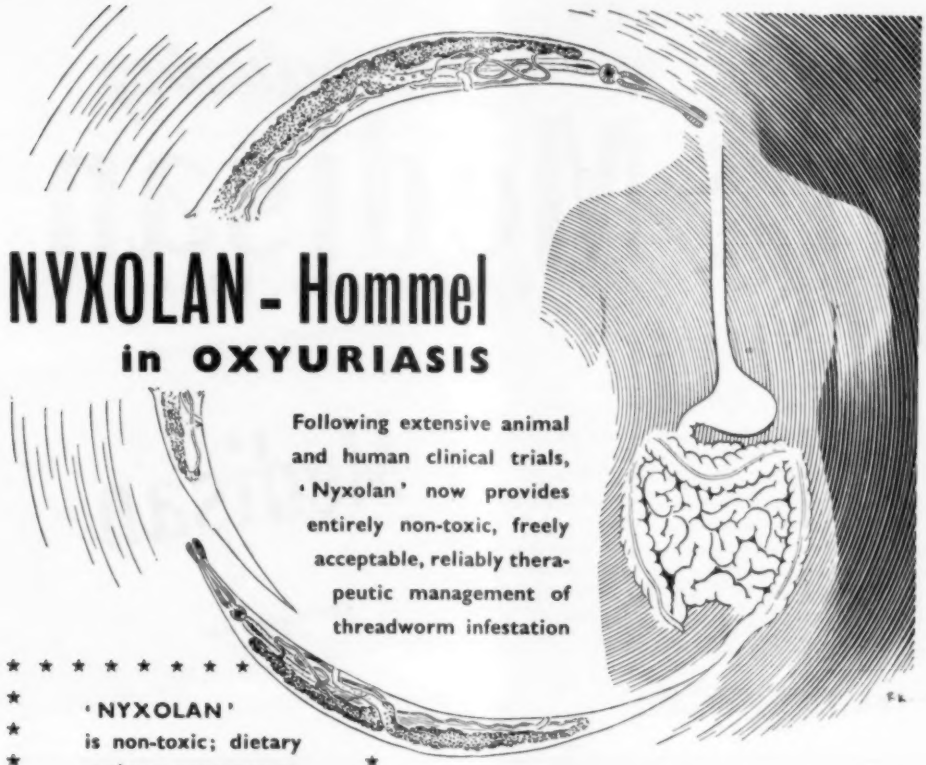
By die poswese as nuusblad geregistreer

Cape Town, 24 July 1954
Weekly 2s. 6d.

Vol. 28 No. 30

Kaapstad, 24 Julie 1954
Weekliks 2s. 6d.


IN THIS ISSUE: IN HIERDIE UITGAWE



# NYXOLAN - Hommel

## in OXYURIASIS

**Following extensive animal and human clinical trials, 'Nyxolan' now provides entirely non-toxic, freely acceptable, reliably therapeutic management of threadworm infestation**

★ ★ ★ ★ ★ ★ ★ ★ ★
★ **'NYXOLAN'** ★
★ **is non-toxic; dietary** ★
★ **regimen unnecessary.** ★
★ ★
★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

**★NYXOLAN is a new, clinically proved anthelmintic**

**COMPOSITION.** 'Nyxolan' is a pleasantly tasting syrup containing 0.4% of aluminium 8-hydroxyquinoline sulphate [Al $(C_9H_6ON)_3$ $3H_2SO_4$.]

**CLINICAL OBSERVATIONS.** Significant trials in medical institutions show that 'Nyxolan' is a most reliable anthelmintic when used alone, i.e. without supportive purgation, enemas or anal counter-irritants. Abstracts from literature describing clinical results are available on request.

**ADVANTAGES.** 'Nyxolan' is not a dye; it is non-arsenical; it does not induce diarrhoea; dietary regimen is not necessary to its successful employment. It is entirely acceptable, even to infants.

**INDICATIONS.** Present clinical experience with 'Nyxolan' refers to *Oxyuris vermicularis*. Besides its indication in oxyuriasis 'Nyxolan' is the preferred treatment in cases of suspected oxyuriasis, e.g. pruritus, anal eczema, masturbation and genital sensitivity in small girls, "caecal irritation".

**FORM AND POSOLOGY.** 'Nyxolan' is presented in liquid form, the active ingredient being incorporated in a syrup which ensures ready acceptance by children.

Daily dosage of 'Nyxolan' is:—Children under 6 years, 1 dessertspoonful thrice daily; Children over 6 years, 1 tablespoonful four times daily; Adults, 2 tablespoonfuls thrice daily.

**PRESENTATION.** Bottles of 8 fluid oz. net.

★ *'Nyxolan' is widely used in other countries under the name 'Aloxyn'. Not publicly advertised.*

**HOMMEL'S HÆMATOGEN & DRUG CO.,** 121 NORWOOD RD., LONDON, S.E.24.

*Our Sole Agents for SOUTH AFRICA:—* **Messrs. LENNON LIMITED**

P.O. Box 39. CAPE TOWN · P.O. Box 24. PORT ELIZABETH · P.O. Box 266. DURBAN, NATAL
P.O. Box 928. JOHANNESBURG, TRANSVAAL P.O. Box 76. EAST LONDON
P.O. Box 1102. BULAWAYO, Southern Rhodesia · P.O. Box 379. SALISBURY, Southern Rhodesia

South African Medical Journal
Suid-Afrikaanse Tydskrif vir Geneeskunde
P.O. Box 643, Cape Town Posbus 643, Kaapstad

Cape Town, 24 July 1954
Weekly 2s. 6d.

Vol. 28 No. 30

Kaapstad, 24 Julie 1954
Weekliks 2s. 6d.

CONTENTS — INHOUD

South African Medical Journal
Suid-Afrikaanse Tydskrif vir Geneeskunde
P.O. Box 643, Gape Town Posbus 643, Kaapstad

Cape Town, 24 July 1954
Weekly 2s. 6d.

Vol. 28 No. 30

Kaapstad, 24 Julie 1954
Weekliks 2s. 6d.

# LAY PROPAGANDA ABOUT DISEASE: A NEW PROBLEM IN A LITERATE SOCIETY*

H. A. SHAPIRO, B.A., PH.D., M.B., CH.B., F.R.S.S.AF.†
*Cape Town*

I propose to illustrate with 4 examples the dangers that beset the modern citizen merely because he can read. To this, of course, we must today add the effects produced by wireless and television. But the problem largely results from literacy, which produces a vast, captive audience on which propaganda can be concentrated with scant attention to either the merits or the accuracy of the case, and limited only by the ingenuity and imagination of the propagandist. Unfortunately education does not go coupled with a capacity to evaluate with discrimination what we have read. It is only by this critical assessment of the printed word that we can distil its honest and scientific worth.

We have seen these techniques applied in recent decades in the field of politics and war, but it should be a matter of public concern that this phenomenon is now invading the field of medicine and medical research. The patient, because he can read, is in a position to accumulate little knowledge about big things. The disturbing position has, in fact, already arisen in which he participates in diagnosis and demands a special form of treatment, of the need or advisability of which he cannot be the best judge.

## 1. PREVENTION OF POLIOMYELITIS

Contemporary propaganda about polio prevention in the lay press presents an arresting example of the problems which I have referred to. It is here that we see to the full the exploitation to its utmost of a newsworthy subject in a way that must necessarily transgress the limits within which medical and scientific workers normally confine themselves.

Poliomyelitis, a virus infection of the nervous system, is, paradoxically enough, a disease of cleanliness. The severity of epidemics is related to a high standard of personal and public hygiene. The price we have paid for sloughing off an environment of filth and squalor has been the creation of a susceptible population in which Nature's balance between man and microbe has been upset.

'In those parts of the world that have not improved their living and sanitary habits, poliomyelitis epidemics are apparently rare and relatively unimportant .... As the (polio) virus is very widely distributed in these so-called "under-privileged" areas, most people come into contact with it while they are quite young,' and progressively acquire their immunity in all probability by way of the mouth (through eating or drinking contaminated material) so that paralytic polio in these countries is comparatively rare.[1] In South Africa, for example, paralytic polio is almost unknown amongst the Bantu.

The mode of infection incidentally suggests that theoretically the best way to immunize infants and children would be to ape Nature's pattern, i.e. to make them eat or drink a safely-attenuated living strain of the virus which can produce immunity against the disease, without causing it. (Yellow fever and smallpox offer good and pertinent analogies.) Such a polio vaccine is not yet known, but there are promising signs that it may be developed. If it comes, it will come as a result of the careful, patient, thorough and painstaking research (unattended by publicity and ballyhoo) that this problem requires and will receive from scientists.

This calm process (in which hope is still deferred) is not, however, the course matters have taken outside the pages of learned journals. To judge by the popular presentation of the case, we have triumphed over polio

* The Popular Lecture delivered at the South African Medical Congress, Port Elizabeth, on 22 June 1954. 

† Editor of the *Journal of Forensic Medicine*; formerly Editor of the *South African Medical Journal*, the *South African Journal of Clinical Science* and *Clinical Proceedings*.

twice in the last 2 years. The first victory should have rendered the second one superfluous—but the public memory is notoriously short.

The first popularly reported 'conquest' over polio goes back to about 1952, when a form of temporary immunity was being investigated by means of injections of gamma globulin, a substance obtained from the blood of ordinary healthy persons possibly immune to the disease because they may already have had the infection and recovered from it. The theory was that gamma globulin, when injected into susceptible subjects, would (for a few weeks) prevent the development of polio because, should the virus gain entry, it would be neutralized by the gamma globulin.

This was neat theory but disappointing fact. In March this year, e.g., the *British Medical Journal* [2] felt the need to comment on gamma globulin because it had been used for the Queen during her visit to Australia at a time of an epidemic of poliomyelitis. The precaution was described as 'harmless' but this authoritative medical publication went on to say that 'extensive use of gamma globulin in the United States has failed to afford this proof' (of its efficacy). It may be that modifications and developments will yet yield a satisfactory technique for producing temporary immunity, but even so some very formidable practical problems would have to be faced.

Cox [3] has calculated that, if the entire U.S. output of gamma globulin were available for treating polio only, just over half a million children could be treated to give them hypothetical protection for one month, i.e. merely 1·7% of all the susceptible children under 10 years of age in the U.S.A. The cost per child would be about £7 per course or about £222 million for a single application to all American children under 10 years.

Moreover, polio strikes in an unusual way. Only 5% of cases of polio give rise to a second case in the family; so for 95% of cases the injection would be wasted.

It is doubtful whether one could at present make out a limited case for individual (as opposed to mass) inoculation, in family and other intimate contacts. Even if one could, there would be considerable difficulties, for gamma globulin has no power to influence the course of the established infection, and is useless even when given in the pre-paralytic stage of the illness.

These facts are all known to medical science. Yet how was the matter handled in the lay press?

One of the world's most influential popular magazines headlined its report: 'GG (gamma globulin) Proves Itself'. It then went on to announce this as the 'biggest breakthrough in the long stalemated war against polio'. Now it is of little consequence to what extent this statement may have been modified in subsequent reporting, because it is the headline that sticks in the public memory. Moreover, in the very nature of things, a complex, arguable, unsolved problem cannot hope to be presented with anything approaching the accuracy required when the techniques of headline reporting are used. I would go so far as to say that the necessary precision scientists adopt is usually impossible in the sensational environment created for popular reportage. This, of course, is why the headlines (i.e. the titles) which research workers use when publishing their own reports in their professional journals are 'weary, stale, flat and unprofitable' from the news man's point of view. What is an aggressively enthusiastic and enterprising reporter to do with the title of a scientific paper such as, 'Passive Immunization Against Poliomyelitis with Especial Consideration of the Effectiveness of Gamma Globulin', particularly when the paper is hedged round with qualifications and restrictions about the claims the writer feels he must put forward with considerable circumspection? This is not the kind of information with which to smash through a stalemate and end one of the greatest scourges of a healthy way of living.

The situation created by the inevitably inadequate lay presentation of this kind of complex research is fraught with undesirable elements. One public health authority in the U.S.A. is quoted, by the same magazine, it must be stated, as saying, 'I shudder to think of next summer's mass hysteria among parents who know about gamma globulin'. He foresaw all kinds of abuses, e.g. bootlegging in G.G.; racketeering with worthless substitutes; faking measles to wangle a shot of G.G. in areas where it was not being given for polio.

These dangers might be contended with by legislative action; but what is equally serious is the danger of raising false hopes, creating an unwarranted sense of security and neglecting normal precautionary measures that should be taken.

A so-called polio-preventible situation unjustifiably engineered in the way we have indicated acquires an appalling element when we read some 15 months later in the same magazine: 'Decision Reversed'. 'At first, gamma globulin seemed to have proved itself as a weapon of definite though limited value against polio .... this week a score of the nation's leading experts on polio and immunization turned thumbs down on G.G. .... After a 3-day discussion of last year's polio outbreaks in communities where gamma globulin was injected into tens of thousands of children and into older members of families in which a case had occurred, the experts concluded: Given to family contacts, G.G. had no effect either in preventing paralytic polio or in moderating its course.

'There is not yet enough evidence to decide whether mass inoculations of all children in the most susceptible group did any good or not.

'The stand-off on the second point meant little, because if mass inoculation had been highly effective, the fact would have been apparent. After studying the report, one authority had a crisp suggestion: forget about G.G. for polio and turn it over to the States for use against measles and hepatitis.'

There has never been the need, in medical circles, to come to such a dramatic conclusion on gamma globulin, which has been regarded in knowledgeable quarters as something undergoing experimental tests with the need for adequate confirmation of the cautious claims made; nor is gamma globulin considered a closed issue so lightly disposed of as it has been in the lay press. Research on this substance will continue, because there are powerful theoretical reasons to pursue this line of inquiry, even though it may not be the answer in the form of mass inoculation against polio. A ticklish situation has, however, developed in practice. On the com-

mendable democratic principle that 'what's good enough for the Queen of England is good enough for my family', demands for gamma globulin will continue to be made at times of panic about polio—and it is difficult to see how any medical practitioner will be able to resist them.

Meanwhile the mass hysteria predicted for the summer following the first claims about G.G. did not develop, partly because a hue and cry had been set up and everyone was in full chase after a new vaccine to prevent polio. Gamma globulin was forgotten and uninhibited publicity was given to a killed vaccine made from the actual polio virus itself. The name of Dr. Salk has become associated with the vaccine. This was, in medical circles, again no bolt from the blue, because the latest experiments represented merely an orderly stage reached after many decades of patient, often unrewarding, research in many parts of the world.

The headline (in the same popular magazine) was a little more cautious this time: 'Closing in on Polio'. But the polio virus was described as a demon to be exorcised by the mystical powers of white-coated researchers. This propagation of mediaeval credulity is an insult to a society which has lengthened man's life span and harnessed the energy of the atom; it is a significant revelation of the problems that face us in persuading the public to discard a wholly anti-scientific approach to its own problems.

Not all experts are agreed that the vast experiment being conducted with such a fanfare in the U.S.A. is timely, necessary, adequate or utterly safe. But whatever reservations we may have about the matter, they would never justify us in creating the sort of situation that was produced by a wireless broadcaster when he said: 'The new polio vaccine may be a killer .... The U.S. Public Health Services tested 10 batches .... found that 7 contained live, not dead, polio virus. It killed several monkeys' (report from the same magazine). In fact, these were test batches made during preliminary trials for mass production of the vaccine, and not prepared according to Dr. Salk's final specifications. It was part of the normal testing precautions to make sure that the mass-produced vaccine would fulfil all the requirements that we would demand of it. The magazine called the broadcast the 'Scare Story of the Week'. It does not require much imagination to appreciate what this must have done to hundreds of thousands of parents honestly and sincerely trying to make up their minds about allowing their children to be inoculated with the new vaccine.

Meanwhile the urgency about this year's polio prevention trials in the U.S.A. originates with the National Foundation for Infantile Paralysis, whose President is 'one-time lay partner of history's most famed polio victim, Franklin D. Roosevelt' .... This rush was partly responsible, reports *Time*, for the resignation of Dr. A. Weaver (who had directed the Foundation's research programme for 7 years) as well as the departure of Dr. Joseph A. Bell, who had left the Public Health Service to supervise the trials for the Foundation.

These discordant notes reflect honest scientific differences of opinion, but accentuated (if not precipitated) by the publicity unfortunately invited by the experiment which one polio researcher has called 'the greatest gamble in medical history'.

Advances in medicine have never been based on the principles of stock-market speculation. Science advances not by trial and error, but by trial and success. The apparatus and techniques of modern medical research can only be employed with success if their functioning is free and independent. We shall not solve the problems of polio prevention by taking them out of the laboratory and throwing them into the market place. The situation in which we find ourselves highlights the new and considerable responsibilities that must be faced by those who propose to make what is newsworthy also trustworthy.

## 2. INTELLIGENCE OF BACKWARD CHILDREN: CLAIMS THAT IT CAN BE IMPROVED

Although the nature of intelligence is not fully understood, we know that the environment (physical and social) in which an individual grows up modifies Nature's hereditary contribution to produce the final result. We have fairly rough and ready tests for measuring intelligence in a way which gives useful information for practical purposes. We also know that the mental age determined by these tests does not always correspond exactly with the physical age.

As a result of many hundreds of thousands of tests some very useful facts and figures have been collected about the distribution of intelligence in the general population. This distribution follows a well-recognized biological pattern known as a normal distribution curve. Some 60% of the population falls within a range we can agree to call normal; the remaining 40% are evenly divided to give 20% of the population above normal, with intelligence increasing to include geniuses, whereas the other 20% have varying diminishing degrees of intelligence to include imbeciles and idiots.

An interesting feature about an individual intelligence-test result (usually recorded as a ratio called the Intelligence Quotient) is that it remains virtually unalterable for the life-time of the person concerned. In other words, whether the I.Q. is measured at 6, 16 or 60 years of age, the result will be more or less the same. This must be qualified to a certain extent, because we recognize that intelligence is the product resulting from contributions made by Nature (i.e. heredity) and Nurture (i.e. the environment). Nature's contribution is unalterable, but the result could be influenced to that extent to which Nurture's influence is variable.

For instance, the intellectual resemblance of identical twins reared together is very close indeed. The differences, in fact, are no greater than the average differences between successive tests on the same individuals. But there is reason to believe that when identical twins are reared apart in social environments of markedly different levels their I.Q.'s will differ very considerably indeed. The problem is further illuminated by what happens to children raised in orphanages. In one experiment, half the orphans in an institution were sent out to nursery school, while the other half remained behind. Those who had the benefit of nursery-school association showed a marked improvement in their

I.Q.'s, whereas those who remained in the orphanage actually deteriorated. The same trend has been observed in the case of the illegitimate children of feeble-minded mothers. When these children were placed with foster parents of average or above-average intelligence, their I.Q.'s improved significantly.

These facts give us some insight into what ways the I.Q. can be influenced and they clearly indicate that improvements can be effected within limits by manipulating the environmental conditions under which children live.

In the same way, the restoration of a child's diet and nutrition to normal or optimal levels may also improve his mental capacity; and in certain diseases due to a deficiency of thyroid secretion the administration of the thyroid hormone may, in some circumstances, restore the I.Q. to normal. But thyroid hormone or improved diets cannot push the I.Q. level above normal for the particular subject; nor will they have any influence in conditions not caused by their deficiency.

As the statistical data indicate that 1 : 5 of the population is below normal, any chemical which had the property of improving the function of the brain despite the retarding effects of the environment would be an almost incredibly valuable weapon of treatment.

A few years ago it was actually claimed that such a substance had been discovered. This substance was of interest particularly because it was the only one of an important chemical group (the amino acids) which the brain could use, especially if the sugar supply which the brain needs for its function should fail. The first reports were on work done with rats but the investigators soon applied their technique to epileptic and mentally backward children. Their results were reported in the scientific press, but other investigators failed to confirm the beneficial effects claimed for glutamic acid in rats and the human experiments were received equally critically. In 1950-51 serious tests of the claims in man led at least 3 different groups of research workers to conclude that a beneficial effect of glutamic acid in the treatment of feeblemindedness had not been demonstrated.

The unusual claims for glutamic acid were, therefore, considered and judged in the dispassionate manner in which medical and scientific claims are judged as a matter of routine, with the result that today no knowledgeable body of opinion seriously regards glutamic acid as a treatment for mental retardation. An interesting claim was found wanting and died a natural death.

Not so, however, in the case of the vast multitudes susceptible to the enthusiastic hopes raised in their hearts because they could read in lay magazines about the wonderful and simple way in which parents could now hope to restore to a reasonable way of life children of most severe degree of mental retardation, e.g. morons and even worse mental defectives; also to convert a child just not able to make the grade for admission to an ordinary school, into a new human being who would now be able to get by and even get along in the ordinary schools.

A vast wave of enthusiasm engulfed those susceptible to propaganda about the glutamic acid treatment of mental defect. Parents demanded the treatment for their children from their family doctors, quoting lay publications in support of their claims. We saw the highly unedifying spectacle of patient instructing doctor how to treat his case. Child-guidance clinics and other organizations concerned with mentally retarded children had the same demands made of them.

It can be stated with some certainty at present that there can be no justification for administering glutamic acid to grossly defective persons, in whom a rise in intelligence of say 6 points would be quite immaterial. It would be disastrous in the extreme to foster unrealizable expectations in the parents of subnormal children, and in many cases to induce parents to pay for expensive treatment which they can ill afford.

It is important to remember that, even if there were anything at all in the glutamic acid mode of treatment, the amino acid is unpalatable and difficult to take. It comes usually in the form of 0.5 g. tablets and a course of treatment which requires 90 tablets a day would mean that the unfortunate victim of the experiment would have to swallow some 32,850 tablets a year. This would keep him busy swallowing one tablet every 5 minutes of an 8-hour working day, and he would have to do this for 2 years, because treatment might have to go on for as long as that. The price of one such adventure in treatment would be about £500. No case has been made out for submitting any patient to such economic hardship with so little expectation of any genuine reward.

It must be clear from what has been said that the causes of mental defect are many and complex. In certain limited ways, something can be done in certain specific cases where the cause of the damage is known to be remediable. South Africa has made a striking contribution of international importance in this respect. I refer to the work of that eminent neuro-surgeon Mr. R. A. Krynauw, who was the first to remove successfully one complete half of the human brain. It was found that this operation improved the intellectual defect as well as the physical disability of certain types of patient who had suffered a birth injury to the brain.

But when we survey the devastating effects which can be produced by unwarranted claims in lay propaganda concerning scientific matters, we must sadly be forced to the conclusion that Mr. Krynauw's brilliant surgery merely proves (what many of us have for long suspected) viz. that many of us do not need so very much in the way of brains anyway.

### 3. TOOTH-PASTE CLAIMS

Seldom have the newspapers, the radio and television been cultivated so assiduously in a triple assault on the eyes and ears of the citizen as in the case of the healing and preventive claims made on behalf of certain tooth-pastes. In all this advertising promotion there is often an implication that the properties of these tooth-pastes have been established by impeccable medical and scientific research. These pastes, it is alleged, can prevent dental decay and cure bad breath or inflammation of the gums. In particular, chlorophyll-containing tooth-pastes are supposed to have been proved scientifically to prevent dental decay.

Yet when I submitted this laboratory evidence (and

its clinical implications) to the Dental Association of South Africa, I was unable to get any kind of professional endorsement from the only expert body of opinion in the country qualified to express an opinion on the matter. This, of course, is fully in keeping with the research report made at the Cleveland meeting of the American Dental Association in September 1953 that there is no definite proof that tooth-pastes 'materially decrease' dental decay. There is certainly no adequate proof in professional journals to support the view that chlorophyll can prevent dental caries.

Chlorophyll (the green colouring matter of plants) has undoubtedly got certain deodorant properties, but it has no special virtue in this respect as far as persistent mouth odours are concerned. Brushing the teeth with any tooth-paste will eliminate odours arising from the teeth themselves for varying times. But these tooth-pastes will not prevent the decay of protein food-particles left behind nor eliminate odours arising from elsewhere than the mouth, e.g. the lungs.

Chlorophyll was by no means alone in the enthusiastic though unwarranted clinical claims made for it. Most energetic has been the campaign for certain anti-enzyme types of tooth paste.

Sugar deposited on the surface of the teeth is thought to be changed to decay-producing acids by the ever-present enzymes. A suitable substance capable of acting for long enough on the teeth and of preventing the enzymes from manufacturing these acids would, according to this theory, reduce decay.

The principle of anti-enzyme action is well recognized in physiology and it is certainly true that *laboratory* tests (under very simplified conditions compared with those in the living subject) showed that certain chemicals might prevent acid formation for considerable periods of time. But it is on this non-clinical evidence that anti-enzyme dentifrices were marketed with the unproved claim that they would give 'all-day decay-acid immunity' after one brushing. Another claim actually made was for 'life-time' protection against decay.

The antibiotics (e.g. penicillin) have also been a source of appeal, but in the U.S.A. permission for over-the-counter sales has been withheld. Few dentists prescribe penicillin-containing tooth-paste, and data from clinical studies question their value. In South Africa this type of tooth-paste has not been heard of much and certainly stringent regulations should govern its supply and sale, even if ultimately some satisfactory case can be made out for it.

The reckless use of antibiotics in the course of self-medication by the ordinary citizen is fraught with grave dangers for himself and others; and this danger is probably enhanced in the case of tooth-pastes dispensed with antibiotics such as penicillin. One of the great problems in the modern treatment of germs with antibiotics is that certain strains of bacteria become invulnerable to antibiotics, especially if the drug is used in inadequate dosage, so that a germ infection is not wiped out or brought under control. The appearance of insensitive strains is, of course, not always quite as simple as this and there is much more to be learned about how it happens.

If we give the bacteria a chance to breed a strain immune to the effects of the drug the result is that, when a serious bacterial infection develops which may actually threaten life, the particular antibiotic may be found to have lost its life-saving powers in a critical emergency. It is in brushing the teeth that the dangers of half-hearted (and unintentional) treatment of bacteria present in the mouth and throat are very great indeed. The use of antibiotic-containing tooth-pastes can only be condemned utterly at present.

The Council on Dental Therapeutics of the American Dental Association has not recognized any tooth-paste as therapeutic. They have as yet (1954) seen no published evidence that warrants claims of great reductions in the incidence of dental caries through the regular routine use of any tooth-paste. In the meantime, as Dr. Robinson [4] has stated, brushing the teeth immediately after a meal offers the best hope for diminishing dental caries 'by hygienic measures' at present. The use of dental floss also has an obvious place in preventive measures.

It would be irrational and unscientific to predict that a tooth-paste capable of diminishing or preventing dental caries will never be discovered. But its announcement is not likely to come through claims made in advertising space bought to boost a sales-promotion campaign.

## 4. CIGARETTE SMOKING AND LUNG CANCER

Tobacco has not been without its importance or its vicissitudes in the history of this country. In his day, van Riebeeck himself proclaimed: '. . . . and that the slaves (children) may be encouraged to attend (school) and hear or learn the Christian prayers, it is ordered that everyone shall receive, after school hours, a glass of brandy and two inches of tobacco.' (Victor de Kock.[5]) I am indebted to Mr. de Kock for most of the following historical data).

Only a year after his arrival at the Cape, van Riebeeck wrote to Holland asking for Caribbean tobacco, 'not too thin in the strands but well and smoothly twisted and not too rotten . . . . The stronger the better, for if it be so strong that their eyes water whilst smoking they consider it good . . . .'

The use of tobacco was not confined to the service of religion. A small piece was usually the price of a sheep, and Theal has stated that without it no trade whatever would have been possible with the early Hottentots. Thus historically our whole economy may be said to rest on the aromatic foundations of the slender tobacco leaf.

Smoking in public came to be recognized as a dangerous practice. In Willem Adriaan van der Stel's time a proclamation (31 October 1704) expressly prohibited smoking in the streets of the Cape Territory or in Table Valley, by day or by night. 'Anyone found with a burning pipe in his mouth in the street will be severely beaten and placed in confinement for 8 days on bread and water.'

Even as late as 6 February 1837, when the regulations for the newly formed municipality of Beaufort West were gazetted, according to the *South African Commercial Advertiser* 'persons walking in the street with a lighted pipe or cigar were liable to a penalty up to £5 and not less than 5 shillings'. All these prohibitions were

intended, of course, to prevent the calamitous hazard of fire.

Tobacco in the form of cigarettes (known to the western world only after the Crimean War, 1854-6) came to the Cape in the 1880's and readily established itself as one of the few innocent amenities of the ordinary citizen.

In the last few years, however, smoking has again come under fire, but for an entirely new reason, viz. a health hazard. A serious claim (based only on statistics) has been made in the medical press that cigarette smoking might be the most important cause of lung cancer. The amount of research done is fairly modest, and confined to 2 or 3 places. Apparently the aristocratic cigar has not been incriminated, and the plebeian pipe is only involved in a minor degree. Medically the issue is by no means settled.' We have really got no further than the formulation of a problem for further testing in scientific circles, because (on the face of it) a case has been made out for serious consideration.

Nevertheless, an unsolved medical problem (which may, in the end, be found to represent an allegation that is without substance) has achieved such wide lay publicity all over the world, that the economic structure of an important industry has been rocked to its very foundations and profound disquiet has been raised in the minds of men and women everywhere about possibly fatal risks they may run by continuing to smoke.

This claim about the cause of lung cancer depends on the further claim that there has been an undue increase in the incidence of this disease in recent years. In explanation of this, a theory has been put forward correlating the present frequency of lung cancer with increased cigarette smoking. The evidence for this is entirely statistical. Confirmation of the hypothesis has further been sought by the recent demonstration in America that a chemical substance is present in cigarette smoke which can produce skin cancer in mice, and that this skin cancer resembles human lung cancer in its appearance.

Does all this constitute a logical sequence in the argument? (We shall omit discussion of lung cancer and smoking in women, although the figures here may actually be regarded as exculpating smoking. Relevant also is the importance of studies on the geographical distribution of lung cancer. Mr. Walter Phillips has drawn my attention to the extreme infrequency of lung cancer in European females in South Africa). To begin with, we may well question whether there has in actual fact been an increase in lung cancer in recent years. We do not have accurate and reliable figures which compare the position today with what it was 50 years ago. This is so for at least 2 or 3 important reasons:

1. The use of X-rays in routine diagnosis is only some 30 years old, and they have been one of the most important causes of the detection of lung cancer on a scale which would have been impossible otherwise.

2. The introduction of mass miniature X-ray surveys in connexion with tuberculosis has revealed cases which may otherwise have escaped detection for some time.

3. Even more recent is the use of special instruments (such as the bronchoscope) which enable the surgeon to look into the depths of the windpipe and its branches, in order to detect cancer or other lung disease.

How can we estimate to what precise extent the present figures for the incidence of lung cancer must be attributed to improved methods of diagnosis? That they are largely due to improved methods of investigation there can be no doubt at all. They may well explain the whole so-called increase observed in this form of malignant disease.

Moreover, we know that the increase in the number of deaths recorded is relatively greater than the increase in the consumption of tobacco, and the nature of the relationship between the *real* increase in lung cancer deaths and the increase in tobacco consumption is completely conjectural.

The marked prolongation of the life span (a striking feature of our times) also complicates the picture. Cancer is a disease which is more likely to appear the longer one lives. An improved life span therefore contributes materially to the incidence of cancer.

Yet even some 20-25 years ago medical textbooks were contending with the claim that lung cancer was genuinely and not spuriously on the increase. Muir's *Textbook of Pathology* discounted the suggestion quite strongly.

Writing in 1938, Maxwell (a leading English chest physician) stated that lung cancer was a very common tumour, but that it was not possible to say with certainty whether it was, in fact, commoner than it was 30 years before. 'Our diagnostic facilities are now so much greater that it is possible to achieve a precision in diagnosis which was unknown in the past, when bronchial carcinoma was considered to be a rare disease. It must be accepted that the condition is extremely common, but as we do not know whether the number of cases has, in fact, increased, it is not possible to discuss the cause of the increase as is sometimes attempted'.

It is not out of place here to consider an analogous situation which has arisen in coronary thrombosis. It may well be, as Paul White says, that coronary heart disease is more common in this day and age: 'At any rate it is certain that the diagnosis is much more often made during life'. He stresses that 'astonishingly little advance was made in the clinical recognition of coronary heart disease until our own generation' (he was writing in 1945). Unless we bear in mind that here is a disease for practical purposes diagnosed only in the last generation, we could contrive the most fantastic claims about its increase and its causes in the twentieth century.

From Texas two American investigators report that the death rate from lung cancer in the different states of America is directly proportional to the number of physicians per 1,000, i.e. to the diagnostic resources of the community. This fact serves once again to emphasize how careful we must be about either making or accepting glib assertions concerning the trend of this disease in recent years.

There are other reasons which will emerge in the sequel and which will illustrate further the almost insoluble nature of this problem. But let us assume for the purposes of the case that there has indeed been a true increase in lung cancer in the last few decades. How good or convincing is the statistical evidence which produced

the alarming suggestion that cigarette smoking is the main culprit?

The most extensive work has been done by two English investigators in the United Kingdom. It is based on an analysis of some 1,357 cases of lung cancer, each of whose smoking habits were recorded at the time the disease was established. For comparison, each lung cancer case was matched for age and sex with a non-lung-cancer case, suffering either from some other type of cancer or some general disease. This second group constituted the control group, whose smoking habits were also recorded by questionnaire.

It is not possible, in the time available, to deal with the numerous points of criticism which can be raised against this statistical investigation. Only 2 or 3 major objections will be considered, but it may well be that these will demonstrate defects which may be regarded as fatal to the argument that cigarette smoking is the fertile cause of lung cancer today.

The claim that smoking is cancer-producing depends on the demonstration that the smoking habits of the lung cancer group, taken as a whole, are statistically significantly greater (i.e. in terms of cigarettes smoked per day) than the habits of the control group.

It is true that such a statistically significant difference between two groups has been shown. But this fact may be wholly irrelevant to the point at issue. The statistical difference merely provides grounds for investigating the problem further and testing the hypothesis derived from it in other ways to establish or refute the theory which has been invented to fit the observations. For example, one way in which the matter could be tested would be to compare the incidence of lung cancer in large enough groups of smokers and non-smokers, provided the groups were similar in all respects other than their smoking habits. Because of the way the English investigators collected their control cases, this test clearly cannot be applied, although it is a very important and possibly necessary one.

The importance of the lengthening life-span for cancer studies has already been referred to. We find that 14% of the cases on which the English authors based their argument consisted of persons 65-74 years old. These are persons more likely to develop cancer merely by reason of their age, and it is unfortunately not possible from the data published to compare their smoking habits with those of the controls.

It is also a well-recognized fact about malignant disease that the incidence of a particular type of cancer may differ in different races. Cancer originating in the liver, e.g., is very rare in the pale-skinned citizens of this country; but it is fairly common in the African population. Another interesting example is cancer of the mouth of the womb, which is extremely infrequent among Jewesses. This may have a relation to the ritual circumcision practised by the Jews; but whatever the reason, these two instances indicate how careful we must be about ensuring the homogeneity of population groups used for research purposes. We have no knowledge of the racial homogeneity of the groups on which either the English or the American investigations have been based. This demand is not an academic one. The blood-group pattern of the British people clearly indicates, e.g., that in dealing with blood groups in the British Isles the source of the sample must be specified, because group O increases steadily from south to north, whereas group A decreases in this geographical direction. Also, blood donors with Welsh surnames and who live near London have a significantly lower frequency of group A than the rest of the local population.

The data collected about the smoking habits of the subjects of the investigation purport to go back over the greater part of a life-time. The answers depend entirely on the subjective recollection of those participating in the experiment, and there is no objective and independent way of checking their accuracy. The English investigators felt themselves to be in something of a quandary because they rejected from their study 156 cases over the age of 75 years, since they felt they could not rely on the memory of these patients. But they arbitrarily kept in 186 patients, i.e. 14%, aged 65-74 years. Why should these have had more reliable memories? If the fear was that those over 75 years were suffering from hardening of the arteries in the brain, this pathological change should have been the basis of rejection and not the arbitrary bar of age.

The cross-check the investigators made on 50 of their subjects after 6 months revealed some variation in reply, but they concluded that 'the data were reliable enough *to indicate general trends and substantiate material differences between groups*' (original italics).

Physiology and pathology, the twin foundations of medical knowledge, have never been advanced by such fallacious methods of research as the subjective one. This is not how insulin was discovered, or the cure for pernicious anaemia; nor, to come closer to our day, is this the way the modern antibiotics were developed. Even in the sphere of mental functions, the unassailable advances being made depend on such objective techniques as the measurement of electrical brain waves.

The extreme fallibility of the human memory for research purposes can finally be illustrated with the example of the menstrual cycle of the human female. Most women are convinced that they can predict the onset of their periods with accuracy. This claim is not surprising, since it is a striking enough phenomenon, with sufficient social inconvenience attached to it to make it appear at first sight as something no woman will reasonably forget about. But when she keeps a calendar, 'she soon finds that her periods do not appear with the precision she had expected.' This fact has now been established thoroughly by such extensive enquiries that it has led to Fraenkel's dictum: 'The only regularity about the menses is their irregularity'.

Let us, however, disregard the objections raised so far and examine the English investigators' figures at their best. They divided their lung cancer cases and the controls into groups according to the average number of cigarettes smoked per day over the 10 years preceding the onset of the present illness. The groups, e.g., were non-smokers, less than 5 cigarettes a day, 5-14, 15-24, 25-49 and 50 plus, per day.

It is clear from their own figures that the majority of smokers by far, in both groups, fall in the range 5-24 cigarettes per day. Yet in the controls, 1,001 subjects (73.8%) fell in this range, whereas among the lung

cancer patients only 964 (71%) qualified for inclusion. We thus have the extraordinary situation that smoking 5-24 cigarettes per day was actually commoner among persons without lung cancer than in persons with lung cancer. In over 70% of the experiment, therefore, the results are the wrong way round, or (at all events) inconclusive; and if we include those smoking less than 5 cigarettes a day as well (but exclude non-smokers) we find that those with lung cancer account for only 75% of the subjects, whereas the controls without lung cancer amount to 83.3%. Over the range of smoking being considered, this clearly establishes that moderate smoking is commoner among persons without lung cancer. Indeed, we can smoke up to 24 a day with impunity. In fact, we could go so far on these figures as to say: A packet a day keeps cancer away!

(It is as well at this point to bear in mind a recent experiment from Cardiff where Basil Wright exposed 160 mice for 18 months to cigarette smoke (i.e. for half their life-span). In the first few weeks there was a high death rate from pneumonia, but thereafter the 'smoking' mice actually lived longer than the 'non-smoking' mice).

If now we go back to the statistics of the matter, we find that the demonstration of a statistical difference between the lung cancer and the control groups depends only on some 25% of the subjects in the experiment, these falling in the group of smokers smoking 25-50 plus, per day. There seems no reason why we should abandon the use of common sense in these statistical matters. If we keep this in mind, it is certainly reasonable to suspect the conclusions drawn on only about a quarter of the cases in the experiment as something applicable to all smokers. At the highest, we could only incriminate very heavy smoking; then we do so on the basis not of over 1,350 cases, but only of a couple of hundred, which does not seem a sound enough basis for action.

There is no mysterious magic about numbers, and we should be on guard against being befuddled by figures. It is salutary to recall that an enthusiastic exploration into what can be done with statistics once yielded the striking result that there is a very high and significant correlation between the seasonal increase in the birth rate and the annual migration of the storks to Sweden.

When there is a significant statistical relationship between two events we have no right to assume that there is a causal connexion as well—as the storks entertainingly prove; nor can we escape the duty of proving that the connexion is one of cause and effect. This has certainly not been done in the case of smoking and lung cancer.

Two other aspects of the statistical data remain *inter alia* for comment.

If smoking is a potent cause of lung cancer, one would expect inhalers to be more seriously affected than non-inhalers. Yet despite American claims in the lay press to this effect, the very extensive English investigation concluded that inhaling was irrelevant. Indeed, 66.6% of the controls inhaled, whereas only 64.6% of the cases of lung carcinoma followed this practice. The significance of this observation may well be related to the remaining point for consideration, viz. the marked difference in the incidence of lung cancer in town and country dwellers.

The English team thought that, on the basis of their hypothesis, this difference between town and country might be due to a difference in smoking habits. Indeed, this would have provided a very striking confirmation of their theory in one important way of testing it. But although they concluded that town dwellers smoked cigarettes more and pipes less, 'the recorded differences in mortality between town and country are greater than could be attributed wholly to differences in smoking habits'. (Rural mortality rate is only about half that of the large towns).

The last two points indicate a reasonable suggestion that if there is something which gets into the lungs from the air and which can then induce lung cancer, it may well be an air pollutant which is commoner in the urban atmosphere where industry and its products are concentrated; and which, moreover, can get into the lungs in the ordinary course of breathing without requiring the specially deep breaths characteristic of cigarette-smoke inhalers.

There is a considerable and impressive body of evidence to support this view. We know that certain tar derivatives (closely related chemically to the sex hormones) can produce cancer. Indeed chimney sweeps and mule spinners were for long subject to cancer of the sexual organs as a hazard of their work. The incidence of cancer of the skin in Iceland is extremely low, only 4 cases having been reported in the 5 years 1944-49. Is this associated with the fact that in Iceland the capital and the surrounding area is free from smoke? Does smog contain, amongst other things, cancer-producing chemicals? Dr. William E. Smith (of New York University—Bellevue Medical Centre—and a former Chairman of the Cancer Prevention Committee) mentioned, at a meeting of the American Cancer Society towards the end of last year, a study made 10 years ago by the U.S. Public Health Service, showing that cancer could be produced in animals by extracts of tarry matter gathered from the air of 8 different American cities. Dr. Smith also referred to a report presented at a symposium sponsored in Belgium in 1952 by WHO and UNESCO. This indicated that the number of lung cancer deaths in English towns increased in proportion to the number of chimneys per acre in the town studied.

But the forceful impact of the evidence does not end here. Kotin (of the University of Southern California) reported in November 1953 to the American Cancer Society that gases from motor cars and diesel exhausts produced cancer 'takes' in the skin of mice; and the New York City Department of Health records that half a ton of tarry material falls on each square mile of Manhattan every month (i.e. 6 tons per square mile per year). Argyll Campbell observed an increase in the lung-tumour rate from 8% to 80% in mice subjected to the prolonged inhalation of road dust with a 2% content of tar.

Dr. Hammond (Statistical Research Director of the American Cancer Society) said as recently as February this year that there was no proof yet that smoking caused cancer. He also drew attention to other possible causes of lung cancer: (1) dust from asphalt roads, (2) increase in motor fumes, (3) a growing urban population which exposes more people to smoke, and (4) a better diet and

vitamins with powerful growth-stimulating properties. (It is perhaps wisest to eat our vitamins with a knife and fork.) He himself would not give up smoking on the available evidence—this from the Statistical Research Director of the American Cancer Society.

Apart from all this direct evidence about cancer production by air pollutants (excluding cigarette smoke) there is another indirect way of checking the theory advanced that smoking is the main cause of lung cancer today. This is by comparing what is happening in the United Kingdom with what is taking place in other countries where sufficiently good records are kept. A useful study of this kind has recently been reported in Australia, where Lancaster found that there was an increased incidence in lung cancer in recent years, but he was puzzled at its being so much less than in the United Kingdom. In the age-group 45-54, e.g., the Australian incidence (1941-45) was 133 per million as against 555 in the United Kingdom (1940-45) and in the 55-64 age-group the Australians had 305 cases per million as against the U.K. figures of 1,116 per million.

The tobacco consumption figures in Australia (1949-51) averaged 4.7 to 4.99 lb. per head compared with the U.K. figures of about 5 lb. per head. This comparative statistical evidence is, therefore, strongly against smoking (tobacco consumption) as the prime cause of lung cancer, and should make us consider seriously what the smoke problem in Australia is like. The vast size of that country, and the state of its industrial concentration and development, suggest striking differences from the British Isles. Moreover, just as smoke is a public problem well-recognized in the U.K. and the U.S.A., we find quite a different situation in Australia. In January this year a contributor to the *Medical Journal of Australia* wrote that the smoke problem in that country was small and mostly confined to isolated areas. He hoped that Australians would profit from the lessons learned overseas.

In review, therefore, we can see that there is a great and impressive body of evidence incriminating the products of industry and modern transport such as air pollutants with cancer-producing properties, which must be excluded as a cause of lung cancer before we jump to the highly debatable conclusions provided by statistics.

There remains for consideration the proof in America last year that cigarette smoke yields a substance which produces skin cancer in mice. It must be stressed that mouse skin cancer bears no relationship to human cancer, and although the American experiment is interesting and valuable, it throws little, if any, light on the human problem. The lungs and the skin are derived from quite different parts of the embryo, and it does not follow that they will respond in the same way to the same irritant. Moreover, all these experiments producing skin cancer with smoke tar extracts use a high concentration of the chemical on the skin, such as never occurs in the lungs of a cigarette smoker, even if he is an inhaler.

The American investigators found that the smoke tar extract had to be painted on to the shaved skin of a mouse 2-3 times a week for an average of 18 months, i.e. half the life-span of this experimental animal. They were struck by this as a coincidence, because they claimed that human smoking habits must also go on for some 30-35 years (half a life-span) before lung cancer is produced. This is, of course, extremely fallacious reasoning. After smoking for 30 years the smoker inevitably reaches an age at which he is vulnerable to cancer of any kind, whether it is connected with smoking or not.

It will not surprise you to hear that the facile suggestion has already also been made that smoking may explain what is happening in cancer of the mouth, tongue, etc. The dangers inherent in these jumps to conclusions are well brought out by Russell [6] who reports that her study (based on the population of 4½ million over a period of 10 years) actually reveals a marked *decrease* of cancer of the tongue and the mouth in men, and a substantial increase in women.

This finally demonstrates the complex nature of the problem and the great caution which must be exercised about the conclusions we dare reach. It is pertinent here also to inquire how convincing chest surgeons and physicians find the evidence. At a recent discussion by a group of these experts in Atlantic City, N.J., when Bostonian Dr. R. Overholt asked the gathering 'whether any of the doctors was so convinced that he was ready to swear-off smoking' not a single hand was raised.[7]

It is, therefore, not unreasonable to characterize the claims made about cigarette smoking and lung cancer as an unwarranted inference on the evidence before us at the present time.

## CONCLUSION

This quartette of examples outlines the problem to which I referred in my opening remarks. The important question posed is: What can be done about it?

I do not believe that censorship in any form is a desirable or practicable way to deal with a problem which, in the end, involves a social conscience and a sense of moral responsibility. Indeed, the more I see of the achievements of legislators, the more convinced do I become that the art of government is to refrain from legislation. This is a principle we might well bear in mind in this connexion.

It is clear that lay sources, when they concern themselves with publicizing medical information (especially of new claims), need to observe a high ethical code and pay a great regard to truth and accuracy in order not to allow sensationalism to invade the necessarily compressed headline. Ultimately, unless such a standard of conduct prevails, medical research workers may feel compelled to invoke the powers they undoubtedly can exercise by severely limiting the copyright of their publications. This would be undesirable and would never, I feel, be considered, except in the last and most extreme resort, partly because of the immense practical problems created by the need to preserve the right of the public to hear and know about what has been achieved.

Indeed, the difficulty mostly arises not with what has actually been accomplished to the general satisfaction of medical scientists, but with work which is in progress and which is still a matter of debate. It is from this source that the most exciting news story usually springs and, unless some kind of reasonable restraint is voluntarily exercised so that unjustified sensationalism should

not continue unchecked, we will soon have the tragic spectacle of the doctor trying to beat his patient in a weekly race to the news-stand to find out what the latest therapeutic miracle is with which he will be confronted in his consulting room.

The responsibility, however, is not confined to the lay press. The situation requires equally great appreciation in the pages of medical journals. New and unusual claims must not have their publication obstructed merely because of their novelty or because of editorial idiosyncrasy. On medical and scientific editors rests the supremely onerous task of satisfying themselves that the results offered for publication have been obtained by satisfactory methods of investigation. This is the test of suitability for publication; not, as I am so often tempted to think, that the article is being printed merely because it has survived the hazards of the postal service.

The incredibly vast advances made in the science of diagnosis and treatment make it clear also that medical curricula must constantly and regularly be adapted to changes in our knowledge. The medical practitioner himself clearly recognizes that his medical training does not cease with his graduation from medical school. For him it continues by means of postgraduate refresher courses and by considerable and industrious attention to the voluminous deluge of technical literature reporting new advances—an important demand on the time and stamina of an already very hard-worked profession.

The recent developments occur not only within the walls of universities and government-sponsored institutions. The whole pattern of medical research has been changed beyond recognition by the remarkable discoveries made by private, commercial pharmaceutical undertakings, which spend many millions on pure research and which have, e.g., yielded such invaluable weapons in the fight against disease as the antibiotics.

It is not out of place here to pay tribute to this brilliant research work of the highest scientific quality, the admirable ethical code which governs the release of this information by the pharmaceutical laboratories concerned, as well as their generous co-operation with the medical profession in the supply of these new and expensive drugs for clinical trials.

A final point needs emphasis. Drastic changes produced in the practice of medicine by the popular requirements of the Welfare State, and the increasing (but not always necessary) fractionation of medical practice into very limited specialities by legislation, have done much to undermine the position of the family doctor. The need to stop this rot is recognized all over the world and strong efforts are being made to remedy the situation. The restoration of the position of the family doctor and that valuable and intangible personal relationship between the doctor and his patient would be a major contribution to a desirable end.

It is, after all, to his family physician that the patient should feel he must turn for advice and guidance in matters medical—not to the pages of lay magazines containing strident claims presented by self-appointed non-medical publicists on behalf of a profession which never invited such promotion.

## REFERENCES

1. Cox, H. (1953): Bull. N.Y. Acad. Med., p. 949.
2. Editorial (1954): Brit. Med. J., **1**, 635.
3. Cox, H. (1953): Lancet, **2**, 3.
4. Robinson, H. B. G. (1954): Postgrad. Med., p. 288.
5. De Kock, V. (1950): *Those in Bondage*, p. 100. London: Allen and Unwin, Ltd.
6. Russell, M. H. (1954): Brit. Med. J., **1**, 985.
7. *Time*, 31 May 1954, p. 31.

## PASSING EVENTS : IN DIE VERBYGAAN

*A Medical Journalism Meeting* sponsored by the World Medical Association will be held in connection with the 8th General Assembly of the Association in Rome from 26 September to 2 October 1954. Thursday 30 September will be devoted to the Medical Journalism programme which, provisionally, will include the following subjects 1, Medical Extracts; 2, Medical documentation; 3, Editorial responsibility in relation to Human Experiments.

* * *

*Royal Society and Nuffield Foundation Commonwealth Bursaries.* Applications are invited for awards under the Royal Society and Nuffield Foundation Commonwealth Bursaries Scheme which was instituted to provide facilities for increasing the efficiency of scientists of proven worth by enabling them to pursue research, learn techniques or follow other forms of study in natural science in countries other than their own in the Commonwealth where the physical or personal environment or both are peculiarly favourable.

The bursaries provide travel, maintenance at a rate of about £600 a year depending on living costs and the applicant's circumstances, and are tenable usually for periods of 2 to 12 months; they are not intended to provide any salary as such. Bursars will not be permitted to prepare specifically for, or to take examinations for, higher degrees or diplomas.

Fuller particulars and forms of application may be obtained from the Assistant Secretary, The Royal Society, Burlington House, London, W.1. Applications should be made before 15 September 1954 for proposed visits beginning during the period from January to June 1955.

* * *

*Locke Research Fellowship.* Applications are invited by the Council of the Royal Society for the Locke Research Fellowship, tenable at any place approved by the Council of the Royal Society, for research in the general field of experimental physiology and pharmacology. Candidates should supply the usual personal details and give the names of 2 referees. Testimonials will not be considered. Applicants and referees at a distance may write direct to the address given below, without first obtaining forms. The subject of the proposed research and the place at which it would be carried out, together with the name of the Head of the Department, should be given.

The appointment will be for 2 years in the first instance, from 1 January 1955, and may be renewed annually for such periods as Council may determine. The successful applicant may only undertake any other work concurrently with the Fellowship upon obtaining the written consent of the President and Council of the Royal Society. The stipend will be £1,250 per annum, with superannuation benefits to which the successful candidate will be required to contribute 5% of annual stipend and to which the Society will make a contribution equal to 10% of the stipend.

Application should be made on forms to be obtained from the Assistant Secretary, the Royal Society, Burlington House, London W.1., and should be received as early as possible, in any case not later than 1 October 1954.

South African Medical Journal

Suid-Afrikaanse Tydskrif vir Geneeskunde

## VAN DIE REDAKSIE

### BLOEDVOLUME

Die bestaan van 'n vloeistof-onewewig kan uit die geskiedenis en fisiese tekens afgelei word, maar dit kan meer akkuraat bepaal word deur die volume en die konsentrasie van opgeloste stof te meet. Die metodes wat tans beskikbaar is om die bloedvloeistofvolumes te skat maak dit moontlik om die liggaamschemie in terme van kwantiteit te beskou, soos byvoorbeeld die totale hoeveelheid van hemoglobien of van die proteïen wat in omloop is. Die vordering wat gemaak is, het die benadering van kliniese vraagstukke oor vloeistof-onewewig en die vereiste vervangingsterapie betekenisvol gewysig. Dit dui ook die rigting aan vir verdere navorsing wat 'n belangrike uitwerking op die gebied van die geneeskunde, snykunde en sekere aspekte van burgerlike verdediging, sal uitoefen.

Die metodes wat gebruik word om bloedvolume te meet het verskeie moontlike foute in gemeen. Van drie metodes is gebruik gemaak: direkte meting van die plasma-volume en berekening van die vloedvolume met behulp van 'n hematokriet; direkte meting van die rooibloedliggaammassa en berekening met behulp van 'n hematokriet; of direkte en tegelyktydige bepaling van beide die plasma- en die rooibloedliggaamvolume.

'n Betekenisvolle toename in bloedvolume is gedurende swangerskap waargeneem—selfs 160 dae voor die bevalling. Gedurende die eerste week van die kraamtyd het hierdie toename verminder tot om en by die helfte van die maksimum en het dit tot 60 dae na die bevalling geneem om tot normaal te daal.[1]

Die betekenis van voor-operatiewe bepalings van bloedvolume is alreeds dikwels beklemtoon. 'n Studie is gemaak van die verlies tydens operasies asook van die simptome wat deur verhoogde bloedvolume veroorsaak word en die noodsaaklikheid van vervanging in die na-operatiewe tydperk. In een reeks is gevind dat bloedverlies tydens operasies van 200 ml. tot 1,000 ml. gewissel het na gelang die liggaamstruktuur wat deur chirurgie [2] verwyder of herstel is.

'n Yslike toename in aanvullings tot die plasma-volume mag vereis word in geval van atoom- of ander bomaanvalle op burgerlike bevolkings. Dit het aanleiding gegee tot aansienlike navorsing oor bloedvolume-herstellingsmiddels, die sogenoemde plasma-volume-uitbreiers. Studies is gemaak van *gelatin*, *dextran*, *polyvidone* (PVP), *oxypolygelatin* en ander stowwe om hul doeltreffendheid en vergiftigingseienskappe te bepaal.

## EDITORIAL

### BLOOD VOLUME

The existence of fluid imbalance can be deduced from the history and physical signs, but the measurement of volume and solute concentration will give more correct estimation of its magnitude. The methods for estimating blood-fluid volumes that are now available allow the body chemistry to be considered in terms of actual quantities, such as the total amount of haemoglobin or of circulating protein. The progress that has been made has significantly altered the approach to clinical problems involving fluid imbalance and the requisite replacement therapy; it also shows the way towards further research that will produce important results for medicine and surgery, and in certain problems of civilian defence.

The methods used to measure blood volume have several possible errors in common. Three methods have been used: direct measurement of plasma volume, and, from the result, calculation of blood volume by means of the haematocrit; direct measurement of the red-cell mass and, from this result, calculation of the blood volume by means of the haematocrit; or direct and simultaneous determination of both the plasma and red-cell volume.

A significant increase in blood volume has been found during pregnancy as early as 160 days before delivery. In the first week of the puerperium this increase diminishes to about half the maximum, and return to normal continues up to 60 days postpartum.[1]

The value of pre-operative determinations of blood-volume has been stressed on many occasions. The losses at operations have been studied, and also the symptoms caused by reduced blood-volume and the need for replacements in the post-operative period. In one series the blood loss during operations was found to vary from 200 ml. to 1,000 ml., depending on the structure removed or repaired by surgery.[2]

A tremendous increase in the requirements for supplements to plasma volume might become necessary in the event of attacks on civilian populations by atomic or other bombs. This has led to much research on blood-volume restorers, the so-called plasma-volume expanders. Gelatin, dextran, polyvidone (PVP), oxypolygelatin, and

Die volmaakte bloedvolume-hersteller moet nie vergiftend, antigenies, of pirogenies wees nie, en moet nie te lank in die liggaam bly nie, miskien net lank genoeg om toe te laat dat die plasma-proteïenkonsentrasie tot normaal terugkeer. *Polyvidone* 3.5% en *dextran* 6% is van die middels wat tans as bevredigend beskou word. *Dextran* is 'n polisakkareid met 'n hoë molekulêre gewig wat na glikogeen aard. Dit word deur ensieme van die bacterium *Leuconostoc mesenteroides*, wat sukrose bevat, vervaardig; die viskositeit en kolloïdaaldruk van 'n 6% oplossing van die finale *dextran*-bereiding is gelyk aan dié van bloedplasma. Dit kom voor asof *dextran* in die liggaam in glukose omgesit word maar dat die bloedsuikergehalte nie verhoog word nie. Die liggaam stoor 'n sekere hoeveelheid. Afskeiding deur die niere hang af van die hoeveelheid en die molekulêre gewig van die *dextran*-bereiding wat gebruik word. *Dextran* kan aan pasiënte wat aan enige bloedgroep behoort, toegedien word. Dit mag allergiese reaksies uitlok.

*Polyvidone* (PVP) is 'n sintetiese makromolekulêre stof en die mening is dat dit nie antigenies is nie. Die bewaring daarvan in die liggaam word deur die molekulêre grootte beïnvloed, die breuk van die laagste molekulêre gewig word deur die niere afgeskei. Net soos in die geval van *dextran* kom dit voor asof 'n hoeveelheid van die nie-afgeskeie deel deur die lewer, die limfkliere en ander weefsel opgeneem word; maar nie deur die harsings, of gedurende swangerskap, die foetus nie.

VERWYSINGS

1. Ravdin, I. S., Walker, J. M. en Rhoads, J. E. (1953): Ann. Rev. Physiol., **15**, 165.
2. Caton, W. L., *et al.* (1951): Amer. J. Obstet. Gynec., **61**, 1207.
3. Saltzstein, H. C. en Linker, L. M. (1952): J. Amer. Med. Assoc., **149**, 722.

other substances, have been studied with regard to their toxicity and their effectiveness.

The ideal blood-volume restorer should be non-toxic, non-antigenic, non-pyrogenic, and it should remain in the body not too long, perhaps long enough to permit the plasma-protein concentration to return naturally to normal. At present polyvidone 3.5% and dextran 6% are among those considered satisfactory. Dextran is a polysaccharide of high molecular weight, resembling glycogen. It is made by enzymes of the bacterium *Leuconostoc mesenteroides* in media containing sucrose; a 6% solution of the final preparation of dextran has a viscosity and colloidal pressure equivalent to blood plasma. Dextran appears to be broken down in the body to glucose, but the blood-sugar values are not increased. Some storage takes place in the body. Execretion by the kidneys depends on the amount and the molecular weight of the dextran preparation used. Dextran can be given to patients belonging to any blood-group. It may produce allergic reactions.

Polyvidone (PVP) is a synthetic macromolecular substance stated to be non-antigenic. Its retention in the body is related to molecular size; the fraction of lowest molecular weight is excreted by the kidneys. As with dextran, some of the non-excreted part appears to be taken up by the liver, the lymph nodes, and some other tissues; but not by the brain or, during pregnancy, the foetus.

REFERENCES

1. Ravdin, I. S., Walker, J. M. and Rhoads, J. E. (1953): Ann. Rev. Physiol., **15**, 165.
2. Caton, W. L., *et al.* (1951): Amer. J. Obstet. Gynec., **61**, 1207.
3. Saltzstein, H. C. and Linker, L. M. (1952): J. Amer. Med. Assoc., **149**, 722.

## BLOOD TRANSFUSION SERVICES

In traumatic surgery the correction of blood loss has come to be recognized as one of the most important single measures available to save lives; and the same therapeutic measure is applicable in blood-deficiency conditions of non-traumatic origin. The public has quite rightly been educated to believe that donation of blood is one of the noble duties a citizen can perform. In our last issue we published an article by Dr. Maurice Shapiro which dealt with an important side of the work of a modern blood-transfusion unit—the preparation of dried human plasma.

Human plasma is one of the 3 sorts of fluid used in intravenous therapy to combat diminution of the blood volume. Whole blood, plasma and synthetic plasma-volume restorers (or 'plasma expanders') each have their own place and indications in this treatment. It is now held that whole blood should be given when there is acute or chronic loss of red cells (e.g., in haemorrhage) and not otherwise; plasma is indicated in certain conditions where there is an insufficiency or absence of blood-fluid constituents, and in cases of traumatic shock unaccompanied by haemorrhage, e.g. burns, where seepage of plasma from the raw surfaces and through dilated capillaries reduces the circulating blood volume. In the latter instance, it is not the resultant loss of protein that kills the patient but the acute loss of circulating blood-volume—a purely mechanical factor. To combat this, various 'blood substitutes' have been tried. From the time of World War I, when a beginning was made with ordinary saline to restore blood-volume loss the search for suitable synthetic plasma-volume expanders, which we refer to in our article on page 631, has continued. What is required is a stable, sterile, easy-to-handle and cheap product having the properties there described.

In South Africa, where long distances and sparse populations render blood-bank storage and organization difficult, and laboratory services are not highly developed, these synthetic plasma-volume expanders may well prove a most important stop-gap measure, a potential saver of lives. But their usefulness is limited to the treatment of acute episodes, as a substitute (often life-saving) for the first pint or two of whole blood or plasma, or as the only intravenous infusion in a case that only requires this amount of replacement.

In programmes for civil defence against enemy action, or other circumstances where large-scale preparations have to be made, the synthetic substitutes may play an

important part in eking out the available resources in whole blood and plasma.

It is, however, always to be realized that they are substitutes and that it is not all the purposes for which blood transfusion is required that they can fulfil.

In this country blood-transfusion services are in the hands of several voluntary organizations which are essentially associations of voluntary blood donors. By far the largest of them is the South African Blood Transfusion Service of which Dr. M. Shapiro is the Director. Its headquarters are at Johannesburg and it has 19 branches scattered over the Rand and the Free State gold-fields, the Transvaal *platteland*, and at Bloemfontein and Kimberley. In his article Dr. Shapiro laid mphasis on the infections and other hazards to which blood and plasma are liable to exposure in the course of preparation for transfusion purposes. It is evident that rigid precautions are necessary on the part of the various blood-transfusion services. It is doubtless with this in view that the Union Government has recently obtained the powers conferred by section 83 *bis* of the Medical Dental and Pharmacy Act (as amended). This section admits the principle of privately-operated blood-donor services, but the Minister may, after consultation with the Medical and Dental Council (this latter clause was accepted in Parliament as an amendment), make regulations for their control. This involves their registration, the prescribing of conditions under which they shall be operated, and the inspection by authorized persons of premises, technical equipment and methods of procuring the blood.

# THE Rh FACTOR OR ERYTHROBLASTOSIS FOETALIS

## A REVIEW AND ANALYSIS OF 37 CASES

I. P. JAFFE, M.B., CH.B.(CAPE TOWN), M.R.C.P.(LOND.), D.C.H.(LOND.)

and

J. RABKIN, M.B., CH.B.(CAPE TOWN), M.R.C.P.(EDIN.), D.C.H.(LOND.)

*Groote Schuur Hospital, Cape Town*

Half a century ago cases of Hydrops Foetalis were described by Dr. Ballantyne, a pioneer in antenatal work in Edinburgh. Later there were reports of deeply jaundiced babies dying soon after birth. Edith Potter enumerates 17 different reasons given for this phenomenon. In 1932 Diamond and his co-workers, Blackfan and Baty, described Erythroblastosis Foetalis as a single entity with various clinical manifestations; Diamond has also been a pioneer in its treatment.

Twenty years ago a new era arose. Levine and Stetson found an atypical agglutinin in the blood of a mother who gave birth to a dead foetus. This agglutinin reacted with an antigen in the father's blood. In 1940 Landsteiner and Levine injected blood from Rhesus monkeys into rabbits and created an anti-Rhesus serum. By testing human red cells against this serum they classified people into Rh positive and Rh negative groups.

Much confusion has surrounded the subject of erythroblastosis foetalis since it attained its status as a clinical entity of great paediatric interest and importance. It is responsible for 6% of all foetal and neonatal deaths. Subtypes of Rh of interest mainly to the geneticist and immunologist, and their complex nomenclature, have made the subject unattractive to the clinician. In this paper we have attempted to present it in a simple manner, to review the recent literature and to draw our own conclusions from the 37 cases we have studied and analysed. The analysis is presented in Table I.

Erythroblastosis foetalis may be defined as a disorder of foetal and neonatal life resulting from maternal sensitization against antigens of the Rh group present in the foetal cells. This accounts for 98% of the cases.

Erythroblastosis due to incompatibility in the ABO system of blood groups we have excluded and it will be mentioned only in so far as it has a bearing on some of the cases to be discussed.

### PATHOGENESIS

The Rh antigen is present in 85% of the white population. In the simple language of the Fisher-Race theory we are chiefly concerned with the genes D and d indicating Rh positivity and negativity respectively. In erythroblastosis the mother is usually Rh— and the foetus Rh+.

The process is as follows: The Rh+ foetal red cells pass through the placental barrier into the maternal circulation and the antigen they contain stimulates the production of Rh antibodies. These antibodies return to the foetal circulation and destroy the infant's Rh+ red corpuscles. Haemolytic anaemia is therefore the essence of the disease. However, the currently prevailing school of thought indicates that the primary damage is not limited to the red corpuscles but involves in some manner an antigen-antibody reaction in the tissues themselves. This concept would account for the manifestations other than anaemia, e.g. oedema, kernicterus, organic damage to the liver and hypertrophy in the islets of Langerhans sometimes seen at autopsy.

Before this haemolytic reaction can occur in the infant's blood the Rh— mother must have been sensitized either by a previous pregnancy or by a previous injection of blood. This introduction of blood acts as a primer and after a latent period of 3—4 months the mother is

ready to produce antibodies in response to a second injection of Rh+ blood. The chance of an erythroblastotic infant being born at the first pregnancy is quite small in women who have never received an injection of Rh+ blood. In most primiparae who give birth to an erythroblastotic infant it is possible to elicit a history of a previous injection of blood. About 1 in 20 of Rh— women who have never received an injection of Rh+ blood will nevertheless have an erythroblastotic baby at the 2nd delivery, but the total incidence of erythroblastosis is 1 in 200 babies.

## CLINICAL FEATURES

### *Clinical Varieties*

There are 3 clinical varieties of erythroblastosis: viz. (1) jaundiced babies, (2) anaemic babies, and (3) oedematous babies.

### *Clinical Findings*

At birth the amniotic fluid and the vernix caseosa may be yellow, and the placenta is large and pale. The infant is rarely born jaundiced but becomes so at any time within 24 hours. He may or may not be anaemic at birth. There is usually an enlarged liver and spleen and a blood smear may show a large number of immature red cells (normoblasts). Any one of these features may, however, be absent.

In 12% of erythroblastotic infants the complication of *kernicterus* will develop, which means that there is bile-staining of the basal ganglia and other areas of the brain. This occurs almost exclusively in infants with marked and prolonged jaundice. Before the 2nd day there are neither clinical nor pathological signs of kernicterus but deaths occurring from the 2nd to the 6th day are usually associated with kernicterus. The diagnosis of kernicterus can be confidently made during the 1st week of life. Approximately one-third of these will survive the 1st week of life, invariably with some central-nervous-system disorder ranging from mild motor incoordination with normal intelligence quotients to very severe motor disability with choreo-athetotic movements and idiocy.

### *Clinical Course of Kernicterus*

The characteristic clinical course is as follows: An Rh+ infant of a sensitized Rh— mother develops jaundice during the 1st day. This jaundice increases in intensity on the 2nd and 3rd days. Sometime during the 2nd or 3rd day the infant becomes lethargic and refuses its feeds, with regurgitation or vomiting frequently occurring.

*The Pathognomonic Signs* then become manifest, viz.:

(1) Disappearance of the normal Moro reflex.

(2) A tendency to sp... s of opisthotonos in which the arms are rigidly extended and inwardly rotated and the fists clenched. This takes the place of the Moro reflex, i.e. it is the response to a startle stimulus, or there may be spontaneous periodic spasms of opisthotonos and rigidity accompanied by a sharp high-pitched cry subsiding in a few seconds as the baby lapses into lethargy.

Convulsions are rare except terminally. Death in acute kernicterus is preceded by periods of gasping irregular respiration, with rales in the chest and a blood-stained discharge in the upper respiratory tract. Death follows in a few hours, apparently due to respiratory failure. The clinical signs are those of pulmonary haemorrhage. Infants with erythroblastosis who survive the first 5-6 days of life without any sign of kernicterus, of which the most subtle is a constant tendency to mild opisthotonos when startled, will usually recover completely as long as the anaemia is attented to.

## PROGNOSIS

### *Antenatal*

(*a*) If an expectant Rh— mother is not sensitized to the Rh factor, there is no possibility of stillbirths being caused by Rh sensitization, but there still remains the possibility of an erythroblastotic infant caused by sensitization to the A B, the Kell, or other blood factors. An Rh— mother without antibodies has as good a chance of a normal infant as any Rh+ mother.

(*b*) The titre of Rh antibodies in the sensitized Rh— mother's serum is regarded by many authorities as the most important factor determining whether or not an Rh+ foetus will be stillborn. Yet occasionally a baby's resistance is high and the expected foetal death does not occur. Again, an unfavourable outcome in the live-born infant is considered to be closely related to the maternal titre; yet a study of our cases shows that it is not always so. Maternal antibody titres (towards the end of pregnancy) of 1/4 (case 18) and 1/8 (cases 4 and 35) have resulted in kernicteric infants, while titres of 1/64 and 1/128 (case 34) have been associated with a relatively mild anaemia which required only simple transfusions. Erythroblastosis in a live-born infant in a family where the 1st or 2nd Rh+ infant was affected is likely to be more severe than when antecedent pregnancies produced unaffected infants.

(*c*) The severity of clinical manifestations does not always increase progressively in succeeding pregnancies; e.g. in families in which the infants of the 2nd, 3rd and 4th pregnancies required transfusions, the 5th may require no treatment and yet the 6th may even be a stillbirth. This fact is of obvious importance in deciding the question of further pregnancies or of sterilization of the sensitized woman. The question must be decided largely according to the desire for further infants. The parents must be told that the outcome is unpredictable and they must be willing to accept a possible unfavourable result.

(*d*) If there is a past history of a kernicteric infant then there is a greater chance that a subsequent live-born Rh+ infant will also show kernicterus.

There is a large positive correlation between a bad result in a live-born infant (particularly kernicterus) and induction of labour at less than 38 weeks of gestation, especially where the maternal antibody titre is high, e.g. 1/64. In a series of 15 cases of kernicterus at Boston in 1945-48, 9 followed labour induced before 38 weeks; and an improved mortality in 1947-48 was due to greater conservatism in the induction of labour rather than to exchange transfusion.

*Postnatal*

The fate of the erythroblastotic infant may be as follows:

(*a*) He may be stillborn with or without hydrops foetalis (gross oedema).

(*b*) Death may occur in a live-born infant from severe anaemia without clinical or pathological signs of kernicterus.

(*c*) Kernicterus may develop in a live-born infant. The majority die in the first week, but about 30% survive—all with neurological sequelae.

(*d*) There may be complete recovery from an illness, mild or severe, which is recognised as erythroblastosis foetalis.

(*e*) The infant may recover without any clinical evidence of disease even though he is an Rh+ infant born of an Rh— mother in whom Rh antibodies have been demonstrated at the time of delivery.

*Degree of Jaundice.*—The early onset or rapid increase in intensity is not necessarily of grave prognostic import, although those that develop kernicterus nearly always show a marked jaundice which persists for a longer time. If the jaundice begins to fade by the 3rd-5th day the prognosis for recovery is excellent, no matter how intense the jaundice was at the beginning.

## MANAGEMENT OF THE CASE

*Before Birth.*—In each case determine the Rh group of the mother and father and, if the latter is positive, whether he is homozygous or heterozygous. In the United States 46% of persons are heterozygous. If a heterozygous Rh+ man marries an Rh— woman there is practically an even chance of a normal infant being born.

The maternal serum should also be tested for antibodies, at regular intervals from the 30th week onwards. In the presence of antibodies of increasing titre in the last 10 weeks, with a bad obstetrical history from the Rh aspect, a consultation should be arranged between the obstetrician, paediatrician and serologist at 36-38 weeks to decide whether to terminate pregnancy. They may favour induction at 38 weeks to yield an infant which may be treated by exchange transfusion. Induction of labour should be reserved for those cases where the likelihood of a stillbirth is very great, e.g. those with a rising titre who have had previous infants stillborn because of erythroblastosis. The indications for Caesarian section are based on obstetrical rather than serological findings (Wiener quotes a higher mortality rate in Caesarian section).

*Immediately after birth* take blood from the cord to determine (*a*) Rh of infant, (*b*) haemoglobin, and (*c*) Coombs test. Nearly all Rh+ infants of sensitized Rh— mothers may be expected to show a positive Coombs test (i.e. the infants cells are coated with antibody). However, there is no evidence that the strength of the Coombs test has any relation to the severity of the disease; e.g. a strongly positive Coombs test may be given by an infant with no clinical disease, as well as a negative Coombs by one with fatal erythroblastosis, such as kernicterus. Cases of erythroblastosis due to ABO incompatability are usually associated with a negative Coombs.

## TREATMENT

*Mild Cases.*—In mild cases of erythroblastosis with no anaemia and slight jaundice in the infant, and with a low antibody titre in the mother, no treatment may be necessary. However, the infant's haemoglobin should be done daily, as there is not infrequently a sudden drop in haemoglobin at about the 7th-10th day, when a simple transfusion of about 15 cc. per lb. body-weight of Rh— blood of the same ABO group as the infant may be all that is required.

*More Severe Cases.*—In more severe cases an exchange transfusion is necessary. The indications for this serious procedure are as follows:

(1) An *immature* infant with a cord-haemoglobin below 15 g. per 100 ml.; also probably 15-17 g. If the haemoglobin is above 17.5g. an exchange transfusion is not indicated (there was no case of kernicterus in 12 affected infants).

(2) A *mature* infant with a cord-haemoglobin below 11 g. Between 11 and 15 g. early simple transfusion is sufficient. Between 15 and 17 g. no treatment need be given, and the incidence of kernicterus is very small. However, it is in this group that the problem exists to detect those few who are going to become deeply jaundiced with the risk of kernicterus.

(3) If a woman has previously lost an infant from erythroblastosis (and this includes kernicterus) it is always wise to treat succeeding infants however mildly affected.

## EXCHANGE TRANSFUSION

*The Objective* of complete replacement-transfusion is to reduce the haematocrit of Rh+ cells to 5% and add sufficient Rh— cells to bring the total venous haematocrit to close on 50%. A nomogram has been worked out mathematically and from the graph the size of replacement transfusion required to achieve this objective can be measured.

There are two methods of performig an exchange transfusion: (1) *via* the umbilical vein, (2) by introducing blood into the saphenous vein at the ankle and simultaneously allowing the baby to bleed from an incision in the radial artery at the wrist.

The details of these methods of Exchange transfusion are well described by Diamond (1947) and Wiener and Wexler (1949). We have used both techniques in 20 recent consecutive cases, all of whom survived. A number of these cases have not been included in this study.

Serum bilirubin levels are helpful in determining when exchange transfusions are needed in erythroblastotic babies who are more than 12 hours old. The bilirubin level must be kept below 20 mg. per 100 c.c. in each case, by multiple exchange transfusion if necessary. Kernicterus is likely to occur in babies with serum bilirubin levels above 30 mg. per 100 c.c., and unlikely to occur when the serum bilirubin remains below 20 mg. per 100 c.c.

## DISCUSSION

In Wiener's series (1949) of 330 infants of Rh— women not sensitized to the Rh factor there were only 4 stillbirths and none were due to erythroblastosis.

In his series (1952) of 210 infants of Rh— women sensitized to the Rh factor there were: (*a*) 188 Rh+ infants—19% stillbirths—5% where maternal antibody was low—75% where maternal antibody was high, and (*b*) 22 Rh— infants—all alive, with no signs of erythroblastosis.

Analysis of our 37 cases does not indicate an invariable parallel between a high maternal antibody titre and a severe outcome nor does a low maternal antibody titre make kernicterus or marked anaemia less likely e.g.:

In case 32 the maternal antibody titre (blocking or incomplete) was recorded as 1 in 8 at 38 weeks and the infant at birth had a haemoglobin of 6 g. with purpura: in case 35 it was 1 in 8, 4 days *post partum*, and the infant was kernicteric; in case 18 it was 1 in 4 and the infant died on the 4th day with clinical kernicterus; in case 34 it was 1 in 128 at 10 days *post partum* and the infant was only moderately affected, requiring 2 simple transfusions and recovering completely.

A rapid rise in maternal antibody titre after the 30th week is frequently, though not invariably, associated with an unfavourable outcome. On the other hand the absence of antibodies at 32, 34 or 36 weeks of pregnancy is no justification for excluding the possibility of an erythroblastotic infant.

Case 37 presented with a maternal antibody titre of 1 in 2 at 38 weeks and an affected infant was born. In case 34 there were no antibodies at 32 weeks and an affected infant was born. The maternal antibody titre was 1 in 128 10 days *post partum*.

Analysis of our 10 cases of kernicterus indicated that:

1. Six cases occurred from 2-parous pregnancies and 1 each from 3-, 4-, 5- and 8-parous.

2. Jaundice was always deep.

3. Coombs test was positive in all the Rh-affected infants. The one case of kernicterus due to ABO-group sensitization (case 11) had a negative Coombs.

4. The spleen was just palpable or not felt at all in 8 cases and moderately enlarged in 2 cases.

5. The haemoglobin varied from 10 g. to 18½ g.

6. Affected infants died from 45 hours to 120 hours after birth.

7. Typical presentation; (*a*) Refused feeds and became drowsy; (*b*) Moro reflex was absent; (*c*) Some had slight twitchings but no convulsions; (*d*) Collapse with gasping respirations followed by tonic spasms; (*e*) Most had bleeding from mouth or nose with coffee grounds; (*f*) Death took place in 5-16 hours of the onset.

Further series of Rh-affected babies quoted by American authors are as follows:

*Age at Death*

| | *Before 6 hours* | *6–24 hours* | *2nd day* | *3rd day* | *4th day* | *5–7 days* |
|---|---|---|---|---|---|---|
| Died without Kernicterus | 9 | 7 | 3 | 1 | 1 | 0 |
| Kernicterus | 0 | 0 | 4 | 5 | 6 | 3 |

*Relation of Kernicterus to Anaemia*

| | *Over 4 million Rbc* | *3–4 million Rbc* | *2–3 million Rbc* | *less than 2 million* |
|---|---|---|---|---|
| Recovered | 91% | 75% | 76% | 59% |
| Died without Kernicterus | 0% | 7·5% | 12% | 33% |
| Kernicterus | 9% | 17·5% | 12% | 8% |

Our series also reveals an inconstant relationship between the degree of anaemia and the likelihood of kernicterus.

## ADRENAL HAEMORRHAGE

A very rare outcome in erythroblastosis is a bilateral adrenal haemorrhage. Case 31 was the 4th infant of a Rh— mother. The first two pregnancies were uneventful. The third infant required a simple transfusion and has remained well. Our case (the 4th infant) was full term. Maternal antibodies were 1 in 16 (incomplete) at 39 weeks. The cord haemoglobin was 13·5 g. Jaundice was slight at 3 hours and became well marked on the 2nd day. The spleen was just palpable. Replacement transfusion of 400 c.c. Rh— blood was carried out at 3 hours after birth. On the 3rd day (53 hours after birth) the infant suddenly gasped and was dead within 30 minutes. This mode of death is unlike that of kernicterus. Autopsy revealed bilateral adrenal haemorrhage.

## ADVANTAGE OF EXCHANGE TRANSFUSION

Exchange transfusion has almost eliminated kernicterus as the most important cause of an unfavourable result in affected live-born babies. In Diamond's series of 116 Rh infants treated by exchange transfusion in 1949 and 1950 there was only one case of kernicterus, which indicates a very significant reduction in mortality.

Where possible an Rh-affected infant should be transfused with Rh negative blood of its own ABO group; e.g. in case 34 the infant was Rh+ group A and the mother Rh— group AB. On the 5th day of life a simple transfusion of 100 c.c. Rh— group-A blood was given and the infant responded well. A repeat transfusion of 120 c.c. at 1 month using Rh— group-O blood (so stated by a private pathologist) resulted in a severe reaction, the infant manifesting shock, an increase in jaundice and the passage of dark urine. The haemoglobin estimated 48 hours after the transfusion did not show a rise corresponding to the amount of blood given. Haemolysis of the transfused blood had evidently taken place.

Replacement transfusion results in early cessation of the jaundice in the majority of cases. Case 13 showed minimal clinical jaundice on the 3rd day. In case 36 jaundice commenced fading on the 3rd day and was absent on the 10th day.

## COMPLICATIONS

A. *Inspissated Bile Syndrome.*—An interesting complication was seen in case 32; this infant, the 4th child in the family, was delivered by Caesarian section at 38 weeks because of a previous history of kernicterus in the family. At birth the cord haemoglobin was 6 g. and the infant presented with purpuric spots over the abdomen and a marked splenomegaly. Such a finding before replacement transfusion was available used almost certainly to herald early death. Jaundice had been noted at 2 hours after birth.

Exchange transfusion of 750 c.c. Rh— blood was performed and during the week following transfusion

TABLE I. ERYTHROBLASTOSIS FOETALIS; RECORDS OF 37 CASES (EXTRACTED FROM RECORDS OF GROOTE SCHUUR HOSPITAL, CAPE TOWN)

| Number | Date | Age on admission | Birth weight (lb.) | Parity | Previous infants | Maternal Rh antibodies towards end of pregnancy | Rh set-up: Mother | Rh set-up: Baby | Rh set-up: Coombs Test | Rh set-up: Haemoglobin g. per 100 ml. | Red blood cells million per c. mm. | Jaundice and time of appearance | Spleen enlarged (finger-breadths) | Blood transfusion (in c.c.), and time | Result |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2·51 | 8 h | | 2 | 1 N. | | – | + | + | 12 | | + | 2 | S 190 (2 occ.) | J subsided 9th d. |
| 2 | 3·52 | 1 h | 8 | 3 | 1 N. 2 is case 1 | R to 1/256 Inc | – | + | + | 16-14·8 | n | ++ | palp | E + 500 | Died at 72 h. PM—K. |
| 3 | 12·50 | B[1] | 7 | 3 | 1 died, forceps. 2 died at 5 d, K. | | – | + | + | 11·5 | | ++, 1 d | nil | E + 500—400 | J subsiding and Hb 12 g., 9th d. |
| 4 | 2·50 | 2 d | 6½ | 2 | 1 died, forceps | | – | + | + | 10 | | ++ | palp | S 90 | Died at 84 h. PM—K. |
| 5 | 4·52 | B[1] | 7½ | 2 | 1 stillborn | R to 1/32 Inc | – | + | + | 14 | | sl, 4 h | palp | E + 500—400 | Hb. 11 g., 8th d. |
| 6 | 10·51 | 2 d | | 5 | 1, 2 and 3 J for 1 w now N. 4 J for 3 d now N. | | | | + | 10 | | +, 1 d | 2 | S 230 (2 occ.) | Died 4th d, with twitching and strabismus. PM—no K and no cer. haem. |
| 7 | 11·51 | 2 d | | 3 | 1 and 2 N | 1/64 | – | + | – | 17 | | +, 12 h | palp | S 590 (4 occ.) | Well. |
| 8 | 9·48 | 2 d | | 2 | 1 N | | – | + | | | 1·5 n | ++ | 3 | S 480 (5 occ.) | Well. |
| 9 | 7·48 | 14 d | 7½ | 2 | 1 N | 'high' | – | + | | | 1 | ++, 1 d | palp | S 400 (2 occ.) | J subsiding 17th d. |
| 10 | 2·52 | 3 h | 6 | 5 | 1 N. 2 J, died on 12th d. 3 N. 4 J, otherwise normal | 1/32 | – | + | + | | 2·6 | sl. | 1 | E + 520—300 | Disch. 11 d old: R.B.C. 4½ million. |
| 11 | 2·52 | 4 d | F | 2 | 1 N. | ABO incompat. No Inc. Ab. | | | – | 'not anaemic' | | ++, 2 d | nil | S 100 | Died 4th d (collapse, vomiting bl.-st. mucus, Moro absent, gasping respiration). PM—K. |
| 12 | | 3 d | | 1 | | No Ab. Presumably ABO incompat. | + | +[5] | – | | 5 | ++, 2 d | 2½ | S 100 | 8th d, J. subsided; well. |
| 13 | 11·52 | B | 6½ | 2 | 1 J, second day simple transfusion | No Inc. Ab Presumably ABO incompat. | + | +[5] | – | 12 | | +, 1 h | palp | E + 386—286 | A kernicterus survival (see note below) |
| 14 | 2·51 | 7 d | 7½ | 2 | 1 N. | | + | +[2] | – | 14 | | ++, birth | nil | nil | ? |
| 15 | 8·50 | 1 d | 7 | 2 | 1 N. | | – | + | + | 11 | | ++, birth | 2–3 | S (3 occ.) | J almost gone 16th d. |
| 16 | 8·49 | 1 d | 8½ | 3 | 1 N. 2 J at birth, subsided in few weeks | | | | + | | 2 | + | 2–3 | S (4 occ.) | Well. |
| 17 | 7·49 | 1 d | 6½ | 3 | 1 and 2 N. | | | | + | 15 | | + | 2–3 | S (4 occ.) | Well. |
| 18 | 5·49 | 2 d | 7 | 8 | 1 N. 2 M. 3 J at birth, died at 3 w. 4 J at birth, transfused, now well. 6 M. 7 born J, died at 3 m. | 1/4 Inc. | | | | 11 | | +, birth | 2–3 | nil | Died after 45 h—drowsy, with gasping respiration. No PM but probably K. |
| 19 | 6·50 | 2 d | 6 | 4 | 1 N. 2 and 3 not J but died at 4 and 6 m. | | – | + | + | 10·5 | | ++ | palp | S 120 | Died at 60 h.—collapsed, gasping respiration. No PM but probably K. |
| 20 | 2·48 | 6 h | 5½[6] | 2 | 1 N. | | | | | | 2·7 n | ++, birth | 1 | S 120 | At 55 h: respiration irregular and panting; vomited blood; blood from nose. Died at 62 h. PM—K. |
| 21 | | 4 h | | | | | | | | | 1·4 n | | | nil | Cyanosis, oedema, purpura. Died on admission—Hydrops foetalis. |
| 22 | | 12 d | F | 4 | 1 N. 2 M. 3 N. | | – | + | | | 2 n | +, birth | 2 | S 200 (2 occ.) | Disch. at 2 m. RBC 3·5 million. |
| 23 | 6·48 | 9 d | F | 2 | 1 N. | | | | | | 1–7 | +, 3 d | 2 | S 180 (2 occ.) | At 3½ w, RBC 4·5 million. |
| 24 | 7·50 | 4 d | 11 | 2 | 1 N. | | | | | 11 | | ++, 2 d | nil | nil | Died 4th d. PM—K. |
| 25 | 10·51 | 11 h | 8½ | 2[5] | 1 died congenital heart | 1/16 Inc. | – | + | + | 16·5 | n | ++, 8 h | nil | E + 370—305 | At 52 h—laboured respiration, lethargic. Died at 58 h. PM—K, intra-alveolar haemorrhages in lungs. |
| 26 | 1·52 | 1 m | 8 | 7 | 1 N. 2 and 3 M. 4 died at 20 d. 5 died at 1 d. 6 died at 12 h[6] | 1/8 Inc. 1 m.pp. | – | + | + | 9·5 | | ++, 3 d (serum-bilirubin at 1 m.) | 1–2 | nil | Disch. after 3 w in hosp. J. subsided. At 2 m. Hb 13 g. |
| 27 | 3·50 | 20 d | 4½ | 3 | 1 N. 2 M. | | – | + | + | | 1·3 | ++ | nil | S 400 (4 occ.) | Well. |
| 28 | 5·49 | 18 d | 8 | 7 | 1 and 2 N. 3 J, died at 3 w. 4 J, died at 5 d. 5 J, died at 2 d. 6 J, still alive. | | | | + | | 4 | ++, 2 d | nil | S 220 (2 occ.) | At 2 m, thymol turbidity 14 and flocculation 4. Not seen again. |
| 29 | 1·52 | 24 d | 7½ | 5[4] | 1 spastic, 2 N. 3 J, died at 4 d. 4 spastic | ABO incompat. | + | +[5] | – | 16·5 | n | ++, 2 d | nil | E + 400 of Rh + blood—330. | |
| 30 | 8·51 | 2 d | | 4 | 1 and 2 N. 3 J at birth, simple transfusion, now mentally retarded | 1/64 | – | + | – | 17—8—10 | n | ++, 2 d | 1–2 | S 80 | Normal infant at 9 m. |
| 31 | 4·52 | 1 h | 8 | 4 | 1 and 2 N. 3 J, first d., simple transfusion, now well | R to 1/16 Inc. | – | + | | 13·5 | n | ++, 3 h | palp | E + 420—400 | Sudden death at 53 h. PM—Bilateral adrenal haemorrhage. |
| 32 | 5·52 | B[1] | | 4 | 1 died, forceps. 2 K, died at 5 d. 3 exchange transfusion, now well. | 1/8 | – | + | + | 6 | | sl., 2 h | 2–3 | E 750 | Also purpuric spots over abd. Developed 'inspissated bile syndrome'. Complete recovery by 7 w. |
| 33 | 4·52 | 2 d | | 2 | 1 N. | Nil at 32 w. | – | + | + | 16 | | +, 2 d | nil | nil | Hb. 12 g. at 12 d. |
| 34 | 10·52 | B | | 2 | 1 N. | 1/128 Inc. 10 days pp. | – | + | + | 17 | n | +, 4 h | nil | S 200 (2 occ.) | Hb fell to 8·59 at 6 w, 10·59 at 8 w. Well. |
| 35 | 10·52 | 4 d | | 2 | 1 N. | 1/8 Inc. 4th d pp. | – | + | + | 12·5 g. | n | ++, 1 d | 2 | | Died at 76 h after tonic spasms at 67 h, followed by gasping respiration and coffee-ground vomiting. T104°F. No Moro reflex. PM—K involving medulla. |
| 36 | 11·52 | 18 h | | 2 | 1 N. | 1/16 Inc. 2nd day pp. | – | + | + | <10 g. | n | ++, 12 h | palp | E + 500—370 | J faded from 3 d and absent at 10 d. 6 w Hg 10 g., 8 w 11·5 g. |
| 37 | 12·52 | 10 h | | 6 | 1 and 2 M. 3 N. 4 M. 5, 8 m. prem., J, now well. | | – | + | + | 17-15·5 g. | n | ++, 6 h | nil | | Well at 3 w. |

*Footnotes.* 1. Caesarian section. 2. One of twins. 3. By present husband (3 normal infants by former husband). 4. By present husband (1 normal infant by former husband). 5. Father also Rh+. 6. Mother was Wassermann+ one year before birth of present child, was treated for syphilis, and was WR– at time of birth.

*Contractions.* h=hour. d=day. m=month. y=year. B=admitted at birth. F=full-term birth. N=normal child (i.e. showing no Rh affection). K=kernicterus. J=jaundice. M=miscarriage. R=rising titre. Inc. or Inc.Ab=Blocking, or incomplete Rh antibodies. Ab=Rh antibodies. pp=postpartum. n=abnormal red blood-cells found. sl=slight. palp=palpable. S=simple (blood transfusion). E=exchange (blood transfusion). occ.=occasions. Hb=haemoglobin. PM=post mortem. RBC=red blood-cells.

*Note.* Case 13, result. Collapsed shortly after transfusion, bleeding from mouth. At 50 hours, twitching, mainly L sided. J slight and Moro reflex present. Responded well to calcium gluconate. Diagnosed as Tetany. Hb 17·8 g. at 5 days, 14·8 g. at 12 days, 10·5 g. at 6 weeks, and infant well. J. thought to be physiological, but when seen at 1 year there was spasticity, athetosis and mental deficiency. A kernicterus survival.

the jaundice persisted, becoming deeper, and the conjunctivae demonstrated the greenish tint of an obstructive type of jaundice. There was well-marked hepatosplenomegaly with elevation of both direct and indirect bilirubin levels. The stools were pale and the flocculation tests were negative. This was the syndrome of 'inspissated bile' defined by Ladd. The clinical syndrome gradually subsided after 6-7 weeks, when the infant was discharged. When seen at 4 months of age, there was no jaundice and no hepatosplenomegaly.

B. *Liver Damage.* In our follow-up series of 7 cases, (see Table II), varying from 7 months of age up to 6 years, we found no evidence of permanent liver damage either clinically or as evidenced by liver-function tests.

C. Infants treated by multiple simple transfusions not infrequently develop an aregenerative phase, when repeated haemoglobin estimations reveal a progressive fall. The infant however, thrives during this period, feeding and gaining well. Further transfusions tend to delay the regeneration. In the majority of cases the bone-marrow appears to recover after 6-8 weeks. For example, case 34 was given a second and final transfusion when a month old, at which time the haemoglobin was 9.8 g. Thereafter estimations done 3 times weekly showed a progressive fall in haemoglobin to 8.5 g. at 6 weeks. Without further blood transfusion or the administration of iron, the haemoglobin rose to 9.5 g. at 7 weeks and 10.5 g. at 8 weeks.

TABLE I (CONTD.). SUMMARY OF THE 37 CASES OF ERYTHROBLASTOSIS FOETALIS

| | | |
|---|---|---|
| *Cause:* | | |
| Rh proved | | 24 |
| ABO probable | | 4 |
| Unproved | | 9 |
| *Result:* | | |
| Survived, normal | | 24 |
| Kernictus survival (spastic, athetotic and m.d.) | | 1 |
| Deaths | | 12 |
| Kernictus (P.M.) | 7 | |
| Kernictus (no P.M.) | 2 | |
| Hydrops foetalis | 1 | |
| Adrenal haemorrhage | 1 | |
| Unknown cause | 1 | |

### ABO INCOMPATABILITY

There were 4 cases of erythroblastosis which were presumed to be due to ABO incompatibility: cases 11, 12, 13 and 29. In all these no Rh blocking antibodies were present and the Coombs test was negative. Diamond and Allen state that the Coombs test is always negative in erythroblastosis due to anti-A or anti-B. Case 11 died on the 4th day with kernicterus confirmed at autopsy.

### SUMMARY

37 cases of erythroblastosis foetalis are reported and analysed.

The criteria for prognosis and treatment are given. A brief review of the recent literature is given.

A follow-up of 7 cases was made to determine whether erythroblastosis foetalis produces liver-disease later.

We wish to thank Dr. Wolf Rabkin for his permission to publish these cases and also for his constant help and advice in the preparation of this paper. We are indebted to the Department of Bacteriology, University of Cape Town, for doing all the Rh studies and liver-function tests.

### REFERENCES

Allen, F. H., Diamond, L. K. and Vaughan, V. C. (1950): Pediatrics, **6**, 441.

Diamond, L. K. (1947): Proc. Roy. Soc. of Medicine, **40**, 546.

*Idem.* (1948): Pediatrics, **2**, 520.

Diamond, L. K., Vaughan, V. C. and Allen, F. H. (1950): *Ibid.*, **6**, 630.

Mollison, P. L. and Cutbush, M. (1948): Lancet, **2**, 522.

Mollison, P. L., Mourant, A. E. and Race, R. R. (1948): Spec. Rep. Ser. Med. Res. Comm., London. No. 27.

Round Table Discussion (1948): Pediatrics, **1**, 799.

Vaughan, V. C., Allen, F. H. and Diamond, L. K. (1950): Pediatrics, **6**, 706.

Wiener, A. S., Nappi, R. and Gordon, E. B. (1952): Amer. J. Obstet. Gynec., **63**, 6.

Wiener, A. S. and Wexler, I. B. (1949): Blood, **4**, 1.

Yi-yung D. Hsia, Patterson, P., Allen, F. H., Diamond, L. K. and Gellis, S. S. (1952): Pediatrics, **10**, 243.

Zuelzer, W. W. and Mudgett, R. T. (1950): *Ibid.*, **6**, 452.

[TABLE II. ERYTHROBLASTOSIS FOETALIS: SEVEN FOLLOW-UP CASES]

| *Name* | *Age* | *Length of stay in Hospital* | *Blood Transfusions* | *Present Haemoglobin (g. per 100 ml.)* | *Mental and Neurological Status* | *Liver (finger-breadths down)* | *Spleen palpable* | *Liver Function Tests* | | | *Maternal Rh-antibody Titres (all blocking)* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | *Thymol Turbidity* | *Colloidal Gold* | *Thymol Flocculation* | |
| GS | 11 m | 5 w | 7 transfusions | 12 | Sitting up unsupported since 10 m. Tries to crawl. Beginning to stand up. Does not say 'Mama' or 'Dada'. No choreo-athetosis. No spasticity. | ½–1 | no | 2·5 | 0 | 0 | 1 in 64 |
| P | 7 m | 8 d | Exchange transfusion a few hours after birth | 12·5 | Sits up well. Says 'Dada'. | ½ | no | <1 | 0 | 0 | 1 in 4 |
| H | 3 y | 2 m | 4 transfusions | 13 | Sat up at 6 m. Walked at 13 m. Talks well. | ½ | no | 1·5 | 0 | 1 | nil |
| O | 2 y | 7 w | 8 transfusions | 12·5 | Walked at 1 y. Appears bright. | 1 | yes | 2 | 0 | 0 | 1 in 8 |
| H | 4 y | 2 m | 9 transfusions | 12·25 | Walked at 1 y. Speaks well. | ½ | no | 2 | 0 | 1 | nil |
| G | 3 y | 3 m | 4 transfusions | 11 | Walked at 15 m. Bright child. | 1 | no | 0 | 0 | 0 | 1 in 32 |
| VDM | 6 y | | A simple transfusion in first few days. | 11·5 | Bright child. | ½ | no | 0 | 0 | 0 | 1 in <2 |

## ANNUAL REPORT OF THE CHAIRMAN OF FEDERAL COUNCIL FOR THE YEAR ENDED 30 JUNE 1954

*Obituary.* It is with deep regret that we have to record the loss through death of the following members: Dr. David Cohen, Dr. G. J. Conradie, Dr. A. O. M. Fehrsen, Dr. N. Feldman, Dr. A. Glatt, Dr. O. Hooper, Dr. M. C. Joynt, Dr. A. Kinghorn, Dr. S. W. V. Leary, Dr. L. S. le Roex, Dr. R. D. McDonald, Dr. G. H. McRobert, Dr. P. F. Marais, Dr. W. H. Myburgh, Dr. C. O'Hagan, Dr. C. A. Phillips, Dr. W. A. Pocock, Dr. A. M. Pollock, Dr. H. G. Pretorius, Dr. D. Roger, Dr. A. Ruben, Dr. W. Rubidge, Dr. R. A. St. Leger, Dr. C. Shapiro, Dr. W. F. Shearer, Dr. I. J. v.d. M. Smit, Dr. E. W. Swift, Dr. C. J. Watson, Dr. I. A. M. Woods, Dr. W. Ziv.

*Membership.* During the past year there has been an over-all increase in membership of 187, the total membership now being 5,031. In addition there are 101 student members. Members are distributed among the various Branches as follows: Border Branch, 194; Cape Eastern Branch, 55; Cape Midlands Branch, 201; Cape Western Branch, 1,107; East Rand Branch, 208; Griqualand West Branch, 94; Natal Coastal Branch, 459; Natal Inland Branch, 174; Northern Transvaal Branch, 452; Orange Free State and Basutoland Branch, 331; Southern Transvaal Branch, 1,317; South-West Africa Branch, 62; Transkei Branch, 74; Unattached members, 276; Emeritus Members, 21; Honorary Members, 6.

*Honours.* During the year the Council honoured Dr. F. P. Bester of Paarl, Dr. C. E. L. Burman of Pietermaritzburg, Dr. S. Copley of Durban, and Prof. B. J. Ryrie, late of Cape Town, by election to Emeritus Membership of the Association. The Hamilton-Maynard Memorial Medal for 1953 was awarded to Mr. D. I. Adler, F.R.C.S., of Johannesburg, for his paper entitled 'Patent Ductus Arteriosus. A Review Based on 24 Cases', which appeared in the *Journal* of 2 May 1953. The Leipoldt Memorial Medal for 1953 was awarded to Dr. G. G. Airey, of Umtata, for his article entitled 'Mechanical Fixation of Fractures of the Shaft of the Femur', published in the *Journal* of 5 December 1953.

*Federal Council Meetings.* Federal Council has met on 2 occasions during the year under review, the first meeting being held at Kimberley and lasting 3 days from 15 to 17 October 1953. The second meeting was held in Johannesburg and lasted 3 days from 29 April to 1 May 1954. The average attendance at the meetings was 43 members. The Executive Committee has met on 2 occasions, both being on the day preceding the Federal Council meetings. The major portion of the work of this Committee was conducted by correspondence.

*The Annual General Meeting* was held in Kimberley on 15 October 1953, and Dr. J. P. Collins was installed as President by Dr. L. I. Braun. The usual formal business was also transacted. The meeting was adjourned and convened during the evening in the Kimberley City Hall, when delegates were welcomed by His Worship the Mayor and Dr. Collins delivered his Presidential Address.

*Congress.* A very successful 39th South African Medical Congress was held at Port Elizabeth during the week 21 to 26 June 1954. Numerous papers were read contributing to the progress of medicine, and both Plenary Sessions were devoted to the subject of *Rehabilitation.* A pleasant social programme was also enjoyed by some 400 members. The Association's thanks are due to the members of the Cape Midlands Branch who were our hosts on this memorable occasion.

*Committees of Council.* The Head Office and Journal Committee continues to render service in looking after the administration and financial affairs of the Association. The Federal Ethical Committee has had no work of importance during the year under review, and the Rules regarding Ethical Conduct are expected to be issued in book form in the near future. The Central Committee for Contract Practice is kept very busy with applications for approval from new Medical Aid Societies, as well as the considerable amount of routine work which falls to it in its supervision of this form of practice. The Parliamentary Committee has continued to watch the interests of members so far as legislation is concerned and has taken up with the Legislature or the Government Departments concerned such matters as have come to its notice. During the year it was successful in negotiating an alteration in the Tariff of Refunds payable by Government Departments for work undertaken on their behalf. These refunds are now based essentially on the Medical Aid Society Tariff less a percentage deduction. A number of Sub-Committees of Council have done useful work in the special spheres allocated to them.

*Journal.* The weekly publication of the *South African Medical Journal* continues to meet with success, and the *South African Journal of Clinical Science* continues to be published quarterly. Mr. W. Fone was appointed as Assistant to the Editor on 1 August 1953 and with his long experience of journalistic work has been of considerable assistance. Dr. E. H. Burrows was appointed to the post of part-time Assistant Editor on 1 March 1954. His main task will be the preparation of the manuscripts of *A History of Medicine in South Africa* for publication in book form.

The Federal Council has agreed that as from 1 January 1955 the *South African Journal of Clinical Science* will be known as *The South African Journal of Laboratory and Clinical Medicine.*

*Branches and Divisions.* The Branches continue to hold regular meetings, and in most cases the Divisions are serving a useful purpose in bringing members together.

*Groups.* The South African Society of Medical Women was recognised by the Council as a new Group within the Association. The other Groups have continued to perform the tasks for which they were established.

*World Medical Association.* The Seventh General Assembly was held at the Hague in October 1953 and the Association was represented at the meeting by Dr. R. Schaffer, of Queenstown, as its official delegate. There were also certain observers. The First World Conference on Medical Education was held in London during August 1953 and a number of representatives of the Association were in attendance and took part in the discussions. The official reports of that Conference have not yet been published.

*Finance.* The funds of the Association were decreased at the end of 1953 by a loss on the year's working of £93. The estimates for 1954 anticipate a surplus of some £1,740.

*Benevolent Fund.* There are now 21 beneficiaries of this Fund. During 1953 an amount of £2,237 was paid out in benevolence. The accumulated funds now stand at £38,003.

*Library Grants.* Grants of £250 each were made to the Universities of Cape Town and the Witwatersrand during the year, and members are reminded that both libraries are at their service either by personal visit or by postal enquiry.

*Medical Agencies.* The Agencies conducted by the Association in Cape Town, Johannesburg and Durban have not received as much support as in the past, and members are reminded that the Agencies exist only for their assistance and are urged to make use of the facilities offered.

*Medical Insurance Agency.* The work of this Agency continues to grow and the Association does all that it can to encourage its members to protect themselves and their practices by adequate cover afforded by the special Doctors' Liability policy arranged by the Association. Members are also becoming more aware of the savings to be effected by the special motor-car insurance policy which has been arranged for their benefit. Members are urged to make more use of the advice and facilities offered, and are reminded that the activity of this Agency adds to the Association's funds by means of commissions earned.

*Conclusion.* The Council would record its appreciation of the work of the Head Office and Journal staff and of all the honorary officials and Committees of the Association.

A. W. S. Sichel
*Chairman of Council*

Cape Town
July 1954

## MEDICAL FEES TO BE PAID BY DEPARTMENT OF DEFENCE

OFFICIAL ANNOUNCEMENT

The Surgeon General has advised that the Department of Defence has agreed to pay medical fees for services rendered by private practitioners on the basis of the *Tariff of Fees for Approved Medi-*

AMPTELIKE AANKONDIGING

Die Geneesheer-Generaal het bekend gemaak dat die Departement van Verdediging ingestem het om doktersgelde vir dienste deur private geneeshere gelewer te betaal volgens die *Tarief vir Goed-*

*cal Aid Societies*, subject to a discount of 15% on all accounts over 25 guineas and 10% on all other accounts.

As this arrangement has received the approval of the Federal Council of this Association, all members are asked to render their accounts in accordance with this agreement.

A. H. Tonkin
*Secretary*

Medical House
Cape Town
13 July 1954

*gekeurde Mediese Hulpverenigings* onderhewig aan 'n korting van 15% op alle rekenings van meer as 25 ghienies en van 10% op alle ander rekenings.

Daar hierdie reëling deur die Federale Raad van hierdie Vereniging goedgekeur is, word alle lede versoek om hul rekenings in ooreenstemming met dié reëling te lewer.

A. H. Tonkin
*Sekretaris*

Mediese Huis
Kaapstad
13 Julie 1954

## NEW PREPARATIONS AND APPLIANCES : NUWE PREPARATE EN TOESTELLE

*Largactil, an additional strength.* Maybaker (S.A.) (Pty.), Limited, advise that they have made available 10 mg. tablets of Largactil Branch Chloropromazine Hydrochloride. Supplies are now available in South Africa.

*Interchangeable Luer Lock Syringes:* Everett's factory representatives, Gurr Surgical Instruments (Pty.) Limited, of P.O. Box 1562, Johannesburg, announce the arrival of stocks of their latest in hypodermic equipment, namely Interchangeable Luer Lock Syringes. The makers state that these syringes are most smooth in action and are provided with most clear and indestructable graduations. The needle fitting is perfectly leak-proof. They solely specialize in the manufacture of hypodermic equipment and are also the makers of Gurr's *Sico* range of needles.

## COLLEGE OF PHYSICIANS AND SURGEONS OF SOUTH AFRICA

The Dean of the Faculty of Medicine of the University of Cape Town has addressed the following letter dated 1 June 1954 to the Secretary of the Steering Committee of the College:

Dear Sir,—The Faculty of Medicine in the University of Cape Town notes with great pleasure the founding of the College of Physicians and Surgeons of South Africa and extends sincere congratulations on this important occasion.

It is hoped that a close rapprochement will develop between the College and the Faculties of Medicine throughout the Union. We wish to convey our good wishes and the assurance that we shall always be glad to support the College in its efforts to maintain or improve the standard of medical practice in South Africa.

Yours faithfully,
(Signed) W. van den Ende

*Dean of the Faculty of Medicine*

## CORRESPONDENCE : BRIEWERUBRIEK

### BARAGWANATH PREMATURE BABY UNIT

*To the Editor:* It has been suggested in your correspondence column that it is unphysiological to starve a premature infant for 1-3 days after birth, and also that normal and premature infants have difficulty in digesting casein.[1]

Investigations have shown that the clinical state of premature infants at the end of 3 days of starvation is most satisfactory and that there are no serious abnormalities of electrolytes and non-protein nitrogen in the serum.[2]

There is no diuretic response to a water load in full-term and premature infants during the first 3 days of life.[3] This is probably one of the reasons why nature provides the newborn infant with only a few millilitres of colostrum for several days after birth.

Starvation of premature infants during the first 3 days of life seems to have 2 main advantages: viz. (1) no fluid is given while the kidneys have difficulty in excreting excess water; (2) dangers from inhalation of gastric contents are minimized. Hypothermic infants are particularly prone to vomit after feeding, and this is avoided if no food is given until the body temperature is stabilized.

We do not agree with your correspondent that premature infants who are not kept in incubators lose significant amounts of water through their lungs. The expected losses are about 8 ml. per kg. of body weight per day,[4] and it is therefore not surprising that the initial weight losses of our infants do not differ significantly from those reported from hospitals which employ incubators.

The present feeding regimen has been in use at this unit from the start, and we are therefore unable to draw comparisons with other methods of feeding. However, it has obvious advantages in an institution with an unskilled staff and where most of the cases are hypothermic on admission. In spite of the initial period of starvation, the total fluid-intake over the first 2 weeks of life is greater in premature infants at this hospital than in most institutions practising early feeding after birth.

Finkelstein showed in 1907 that sick and healthy infants alike have no difficulty in digesting casein, and it is now recognized that the same applies to premature infants, who can even be fed on meat.[5] While we are criticized by your correspondent for using too much casein in our mixture for the artificial feeding of premature infants, the opposite view is expressed in a letter received from Dr. V. Mary Crosse, to whom a copy of the manuscript of our article [6] was sent before publication. She writes *inter alia*: 'May I make one suggestion which may still further improve your results, i.e. that you use a cow's milk mixture with a higher protein content. We have found that a cow's milk mixture with a high protein-content gives results more comparable to breast milk in regard to mortality rates, infection rates, haemoglobin levels and serum-protein level. A paper of mine on this subject is coming out shortly in the *Archives of Disease in Childhood*.'

E. Kahn
S. Wayburne
M. Fouché

Johannesburg

1. Lomax, F. A. (1954): S. Afr. Med. J., **28**, 560 (26 June).
2. Hansen, J. D. L. and Smith, C. A. (1953): Pediatrics, **12**, 99.
3. Ames, R. G. (1953): *Ibid.*, **12**, 272.
4. Hooper, J. M. D., Evans, I. W. J. and Stapleton, T. (1954): *Ibid.*, **13**, 206.
5. Andelman, M. B., Gerald, P. S., Rambar, A. C. and Kagan, B. M. (1952): *Ibid.*, **9**, 485.
6. Kahn, E., Wayburne, S. and Fouché, M. (1954): S. Afr. Med. J., **28**, 453 (29 May).

## Bridgman Memorial Hospital

### REGISTRAR IN OBSTETRICS

Applications are invited for the above post. The closing date for applications is 16 August 1954.

At the above Non-European Maternity Hospital there are approximately 3,000 deliveries a year. It is a Non-European Midwifery Training School, and students of the University of the Witwatersrand Medical School undergo a portion of their practical training in Obstetrics at the Hospital. Bridgman Memorial Hospital is recognised for purposes of M.R.C.O.G.

Emoluments £620—780—820—860.

Commencing salary will depend on previous experience.

Cost of Living Allowance: Married £352 per annum; Single £172 18s. per annum.

Applications, including testimonials and full details of previous experience, should be addressed to: The Superintendent, Bridgman Memorial Hospital, High Street, Mayfair, Johannesburg.

Applicants must state the earliest date at which they can commence duties.

# The Medical Association of South Africa
# Die Mediese Vereniging van Suid-Afrika

## AGENCY DEPARTMENT : AGENTSKAP-AFDELING
## CAPE TOWN : KAAPSTAD

### PRACTICES FOR SALE : PRAKTYKE TE KOOP

**(1596)** Kaapse Middellande, Hospitaaldorp. Goedgevestigde eenmanspraktyk. Totale Bruto Ontvangste: 1952 ± £2,300, 1953 ± £2,430. Prys vir klandisiewaarde, medisyne, meubels en instrumente, £750 of naaste aanbod.
**(1457)** Goed gevestigde Westelike Provinsie praktyk. Netto inkomste oorskry £3,000 per jaar. Huis beskikbaar. Verband kan gereël word. Volle besonderhede op aanvraag.
**(1530)** Karoodorp. Eenmanspraktyk sonder opposisie. Gemiddelde inkomste £2,000 p.j. Premie verlang £700. Huis te huur teen £8 p.m. D.S. aanstelling.
**(1655)** Cape Town. 2 Branch practices. Income 1953 £2,244. 2 Surgery and 3 waiting rooms available on very satisfactory terms. Definite scope for expansion. Nearest offer. Terms acceptable.
**(1653)** Noord-Kaapland. Vooruitstrewende woldistrik. Gemiddelde ontvangste per jaar £4,150. D.S. aanstelling. Koopprys £2,000 sluit ook al die geneesmiddels in, ter waarde van bykans £1,000. Huis te koop.
**(1659)** Windhoek, S.W.A. Well established prescribing practice for health reasons. Particulars on application.

### ASSISTENTE/PLAASVERVANGERS VERLANG

DAAR IS 'N DRINGENDE ONMIDDELLIKE BEHOEFTE VIR ASSISTENTE EN/OF PLAASVERVANGERS IN PLATTELANDSE EN STEDELIKE GEBIEDE. BESONDERHEDE OP AANVRAAG:

### TE KOOP

**(1513)** Spreekkamermeubels, geneesmiddels en instrumente. Besonderhede op aanvraag.

* * *

### DURBAN

112 Medical Centre, Field Street. Telephone 2-4049

### PRACTICE FOR SALE

**(PD25)** Durban. House and practice available, suitable for a surgeon. Details on application.
**(PD26)** Transkei. Practice established 8 months ago. Average monthly turnover £126/£140. Two appointments held District Surgeon and M.O. to Native Recruiting Corporation. New outstation clinics could be opened. Trout and river fishing within 15 miles. Will consider any offer.
**(PD/27)** Drakensberg Native Reserve area. Dispensing practice established February 1954 on part-time basis. Cash takings approximately £400. Buyer to take over drugs at cost, approximately £150 and equipment £60. Goodwill to be calculated as a percentage of the takings at the end of July.
**(PD28)** Durban. General practice also non-European surgery. Owing to ill-health owner wishes to sell as soon as possible. Before illness gross income £3,000 per annum. Premium £2,000. House for sale.

### LOCUMS REQUIRED

Zululand. For two months or possibly longer. £2 12s. 6d. per day, all found and car allowance.

### ASSISTANT REQUIRED

**(AM2)** Assistant required for trial period. If suitable partnership will be offered. General practice in select area approximately 20 miles from Durban.

### INSTRUMENTS FOR SALE

Two Electrocardiograph machines in first class order. Owner acquiring self-reading machine. Offers to be made.
Davidson Pneumothorax apparatus. Practically new. Any offer considered.
Super-sonic (Impulsaphon) Machine in perfect condition. £250 immediate sale.

### JOHANNESBURG

Medical House, 5 Esselen Street. Telephone 44-9134-5, 44-0817
Mediese Huis, Esselenstraat 5. Telefone 44-9134-5, 44-0817

### ASSISTENTE/PLAASVERVANGERS VERLANG
### ASSISTANTS/LOCUMS REQUIRED

**(561)** Wes-Transvaal. Assistent benodig vir vennootskapspraktyk. Goeie salaris word aangebied. Fasiliteite vir chirurgie binne afsienbare tyd. Aangename praktyk en omgewing.
**(587)** Wes-Transvaal. Plaasvervanger vir September. Salaris £3 3s. per dag en alles vry.
Southern Rhodesia. Locum as from 21 September till 7 February. Own car necessary.
**(597)** Assistant to start immediately. Definite view to Partnership. Preferably young Jewish doctor.
**(598)** Plaasvervanger benodig—moontlikheid van verdere assistentskap, in Transvaalse dorp. Geen hospitaal. Goeie salaris en vooruitsigte.
**(600)** Aangename Natalse dorp, met hospitaal. Assistent met definitiewe oog op vennootskap.
**(604)** Oos-Transvaal. Plaasvervanger vir Augustus in vennootskapspraktyk. Salaris £2 5s. per dag en alles vry. 'n Kar word verskaf vir distrikswerk.
**(605)** Reef town. Locum for August, in partnership practice. Terms: £3 3s. per day and all found. Married man could stay in principal's house.
**(606)** Eastern Transvaal. Assistant to start as soon as possible. Salary and allowances to be arranged.
**(608)** Reef partnership practice. Locum from 1 August till 14 August. Own car necessary.
**(609)** Plaasvervanger vir September in groot Transvaalse dorp. £3 3s. per dag, alles vry en 'n kartoelae. Getroude persoon kan in hoof se huis woon.
**(610)** O.V.S. vennootskapspraktyk. Plaasvervanger vir Augustus. Salaris en toelaes om gereël te word.
**(612)** Town near Johannesburg. Assistant is required to start as soon as possible. Definite view to partnership. Excellent salary offered. Preferably someone interested in surgery.
**(613)** Suburban practice—Johannesburg. Locum as from 8 till 20 August. Car provided. Excellent salary.
**(614)** Randse vennootskapspraktyk. Plaasvervanger vir Augustus. Eie kar nodig. Goeie salaris en voorwaardes.
**(593)** Reef hospital town. Very large and busy practice. Assistant to start 1 September. Own car necessary. Excellent salary and car allowance offered.

### PRACTICES FOR SALE

**(Pr-S128)** Drakensberg. Doctor going overseas wishes to sell his Native dispensing practice, established February 1954. No opposition, no travelling and weekends free. Native population 20,000. Tremendous scope for expansion. Cash taking to end June £680. Drugs £150, equipment £60, goodwill £350. Ideal for doctor who wishes to study. Holiday resort area. All sporting facilities.
**(Pr-S135)** Reef hospital town. Practice established 3 years ago. Owner selling for personal reasons. House available if required. Very low premium. Further details on application.

### INSTRUMENTS FOR SALE

**(I/066)** One brand new Zeiss microscope, never been used. Cost £75, but will accept £65.
**(I/067)** Untra-klank (Impulsaphon) masjien, met leertas. Een jaar in gebruik. Eienaar vertrek oorsee. Prys £200.

---

### HONORARY PHYSIO THERAPIST

Applications are invited for the post of Honorary Physio Therapist to the Witwatersrand Jewish Aged Home, to fill the vacancy caused by the death of Dr. W. Ziv.

Applications are to be addressed to The Secretary, P.O. Box 782, Johannesburg. 1607

---

### ASSISTANT/LOCUM REQUIRED

Assistant required with view to doing locum in country partnership near Maritzburg from 1 August for 3 months. Salary £3 3s. per day, all found. Own car necessary. Write to A.V.T., P.O. Box 643, Cape Town.

## Studiebeurse 1954

(1) Aansoeke word ingewag van behoorlik gekwalifiseerde kandidate wat in aanmerking wil kom vir die volgende tipe studiebeurse, waarvan na verwag word *alleenlik twee* deur die Wêreldgesondheidsorganisasie beskikbaar gestel sal word:

(*a*) Sielsiektes—met spesiale aandag aan die hospitalisasie en en behandeling van relatiewe korttermyngevalle.

(*b*) Pneumokoniose—spesiaal met betrekking tot kliniese manifestasie en die bepaling van ongeskiktheid.

(*c*) Die Nasionale Gesondheidsdienste in Engeland en Skotland en hulle toepaslikheid, geheel en al, of gedeeltelik, in Suid-Afrika.

(*d*) Plattelandse Apteekskemas in ander gebiede van Afrika en hulle toepaslikheid in Suid-Afrika.

(*e*) Tuberkulose spesiaal met betrekking to „B.C.G."—inenting, tuisbehandeling en rehabilitasie.

(*f*) Omgewingsgeneeskunde—met spesiale aandag aan die uitwerking van klimaat-, etnologiese en voedingsverskille op gesondheid in Afrika.

(*g*) Mediese onderwys—spesiaal met betrekking tot nagraadse opleiding.

(*h*) Die opleiding van mediese en ander gesondheidspersoneel.

(*i*) Epidemiologie en Statistiek.

(*j*) Voedselhigiëne.

(2) Die beurse is geldig vir ongeveer ses maande en die waarde daarvan is as volg:

A. *Reisstatus.*

(i) 300 $ per maand in nie-gedevalueerde lande.

(ii) 240 $ per maand in gedevalueerde lande.

B. *Woonstatus.* (Van toepassing wanneer die beurshouer vir meer as 15 dae op een plek bly.)

(i) 200 $ per maand in nie-gedevalueerde lande.

(ii) 160 $ per maand in gedevalueerde lande.

(3) Soos in paragraaf (1) aangedui sal *Beurse tot twee beperk word en die toekenning van sodanige beurse sal onderworpe wees aan die beskikbaarstelling van die nodige fondse deur die Wêreldgesondheidsorganisasie sowel as die finale goedkeuring deur daardie Organisasie van die twee kandidate wat aanbeveel is.*

(4) Beurse word toegeken slegs aan gegradueerdes wat in verband met openbare gesondheidsdienste, mediese onderwys of mediese navorsing werksaam is of sal wees.

Daar dien op gelet te word dat:

(*a*) die maatstaf vir die toekenning van 'n studiebeurs die nuttigheid van die persoon vir bogemelde dienste is en aansoeke sal in dié lig oorweeg word liewer as in die lig van verdienstelikheid;

(*b*) toekenning uit die beperkte geldmiddele van die Wêreldgesondheidsorganisasie nie gedoen kan word om diepsinnige akademiese navorsingsplanne te steun nie en applikante se voorgestelde programme derhalwe prakties moet wees en buitensporige reise en besoeke na verskillende lande moet vermy. Programme behoort voorsiening te maak vir 'n paar betreklike lang besoeke aan lande waarvan die inrigtings en dienste waarskynlik die geskikste opleiding vir Suid-Afrika sal verskaf;

(*c*) besoeke aan die Verenigde State van Amerika vir die Wêreldgesondheidsorganisasie uiters duur is solank devaluasie voortduur en sulke besoeke dikwels geen besondere voordeel het in vergelyking met besoeke aan Europese lande wat inrigtings en dienste vergelykbaar met dié in Suid-Afrika bied nie.

(5) Van suksesvolle applikante sal verwag word dat hulle 'n skriftelike verbintenis met die Organisasie aangaan dat hulle òf sal voortgaan in òf sal toetree tot die diens van hulle nasionale gesondheidsadministrasie vir 'n tydperk van minstens drie jaar na die voltooing van hulle studiekursus. Die uitdrukking nasionale gesondheidsadministrasie omvat alle vorme van voltydse openbare mediese dienste insluitende navorsing en onderwys.

(6) Die toekenning van 'n beurs sal vervoer en dergelike koste van die land van herkoms af na die land waar die studie onderneem word en terug (dit is internasionale reise) stipendium en goedgekeurde reise, binne die land waar die studie onderneem word en ander uitgawes wat die Direkteur-generaal uitdruklik goedkeur, insluit.

(7) Vir reise binne die Unie van Suid-Afrika of Suidwes-Afrika, wat nie deur die internasionale reiskaartjies wat deur die Organisasie verskaf word, gedek is nie, moet die beurshouer self betaal.

(8) Kandidate moet Suid-Afrikaanse burgers of burgers van 'n Statebondsland of burgers van die Republiek Ierland wees en moet vir 'n tydperk van minstens drie jaar in die Unie van Suid-Afrika of in Suidwes-Afrika gewoon het.

(9) Aansoekvorms is by die Sekretaris van Gesondheid, Posbus 386, Pretoria, verkrygbaar. Wanneer 'n aansoekvorm gevra word, moet vermeld word vir watter een van die beurse genoem onder paragraaf (1) hierbo die kandidaat in aanmerking wil kom.

(10) Dit sal die verantwoordelikehid van die suksesvolle applikant wees om met sy huidige werkgewer afwesigheidsverlof te reël, met die doel om die beurs te aanvaar. Wat Staatsamptenare betref, kan besonderhede van die grondslag waarop afwesigheidsverlof toegestaan sal word by die Sekretaris van Gesondheid, Posbus 386, Pretoria, verkry word.

(11) Ingevulde aansoekvorms sal tot en met 31 Julie 1954 ontvang word. Vorms wat na hierdie datum ontvang word, sal nie oorweeg word nie.

46173

---

## Natal Provincial Administration

### VACANCY: REGISTRAR

Applications are invited from registered Medical Practitioners for appointment to the following post:

Registrar: Department Ear, Nose and Throat, Addington Hospital.

Salary Scale £720—840x60—1,020 per annum less £180 per annum in respect of board and lodging if supplied. Employment is in a permanent or temporary capacity and services are terminable by the giving of 3 months notice on either side.

A temporary cost of living allowance is payable at the following rates:

Single: £100 per annum.
Married: £320 per annum.

Applications giving full details of experience should be addressed to the Medical Superintendent, Addington Hospital, Durban, as soon as possible.

AD8231

---

## South African Railways and Harbours Sick Fund

Applications are invited from registered medical practitioners for appointment to the following position:

Railway Medical Officer, West Bank (East London "F"): Salary £1,149 p.a., plus a transport allowance of £75 p.a.

Full particulars of the appointment to be obtained from the District Secretary, Cape Eastern District Sick Fund Board, 19 Terminus Street, East London.

Closing date for applications: 16 August 1954.

P. J. Klem
*General Secretary*

Johannesburg
24 July 1954

---

# Transvaal Provincial Administration

## VACANCIES : TRANSVAAL PUBLIC HOSPITALS

Applications are invited from suitably qualified candidates for the undermentioned posts at Public Hospitals in the Transvaal.

Applications should be addressed to the Medical Superintendents of the undermentioned Hospitals concerned and should contain full particulars as to the age, professional and academic and language qualifications, experience and conjugal status of the applicant and should further indicate the earliest date upon which duties can be assumed. Copies, only, of recent testimonials to be attached.

Cost of Living Allowance payable at present to full-time employees:

| *Salary* | *Cost of Living Allowance* *Married* | *Single* |
|---|---|---|
| Over £350 p.a. | £352 p.a. | £110 p.a. |

Full-time employees receive in addition to their salaries and cost of living allowance, the following privileges:

Leave and rail concession.

Successful candidates will be required to submit satisfactory certificates as also to submit to a medical examination at the hospital concerned.

Application forms are obtainable from any Transvaal Provincial Hospital or the Provincial Secretary, Hospital Services Branch, P.O. Box 2060, Pretoria.

The closing date of applications for undermentioned posts will be 4 August 1954.

| *Post* | *Hospital* | *Salary* | *Qualifications and Remarks* |
|---|---|---|---|
| Senior Anaesthetist | Pretoria | £2,000 p.a. | Registered Medical Practitioner. Higher Degree in Anaesthetics essential |
| Senior Anaesthetist | Pretoria | £1,800 p.a. | do. |
| Part-time Assistant Physician | General Johannesburg and the University of the Witwatersrand | £513 p.a. 2½ sessions per week | Registered Medical Practitioner. Higher Degree in Medicine essential |
| Part-time Facio-Maxillary Surgeon | Vereeniging | £102 10s. p.a. ½ session per week at £205 per session per annum | Registered Dentist. Must be suitably qualified through training and experience |
| Casualty Officer | Discoverer's Memorial, P.O. Florida | £620, £780, £820, £860 | Registered Medical Practitioner. |
| | Tara, Johannesburg | £620, £780, £820, £860 | do. |
| Medical Registrar | Coronation Johannesburg and the University of the Witwatersrand | £620, £780, £820, £860 | Registered Medical Practitioner. Must be qualified for at least 2 years |
| Registrar (Orthopaedics) | General, Johannesburg | £620, £780, £820, £860 | do. |
| Clinical Assistant (Surgery) | Pietersburg | £620, £780, £820, £860 | do. |
| Clinical Assistant | Warmbaths, Non-Acute | £620, £780, £820, £860 | do. |
| Senior Resident Medical Officer | Barberton | £480 p.a. Plus board and quarters or an allowance of £120 p.a. in lieu of board and quarters | Registered Medical Practitioner |
| *Or* | | | |
| Intern | Barberton | £240 p.a. Plus board and quarters or an allowance of £120 p.a. in lieu of board and quarters | — |
| Senior Resident Medical Officer | Far East Rand, P.O. New State Areas | £480 p.a. Plus board and quarters or an allowance of £120 p.a. in lieu of board and quarters | Registered Medical Practitioner |
| Intern | Far East Rand, P.O. New State Areas | £240 p.a. Plus board and quarters or an allowance of £120 p.a. in lieu of board and quarters | — |

46285



# Appointment of Full-Time Additional Assistant Medical Officer

Applications are invited for the post of Additional Assistant Medical Officer. The salary will be Ninety pounds per month together with a cost-of-living allowance of Twenty pounds per month.

Qualifications being equal, preference will be given to married applicants of not less than two years post-internship experience.

An unfurnished house will be provided free for a married doctor. In the case of a single man being appointed he will reside at a local hotel where he will be responsible for his own living expenses.

A vehicle is provided but solely for use in the performance of company medical duties.

The successful applicant will be expected to participate in the Company Group Life Insurance and pension scheme.

Commencement of duty is to take place on or as soon as possible after 1 September 1954.

The prescribed application form and full particulars concerning the appointment may be obtained from the Chief Medical Officer, O'okiep Copper Co., Ltd., Nababiep, C.P.

(This appointment has the approval of The Medical Association.)

# Munisipaliteit van Frankfort

## DEELTYDSE GENEESKUNDIGE GESONDHEIDSBEAMPTE

Aansoeke word ingewag vir die betrekking van deeltydse Geneeskundige Gesondheidsbeampte teen 'n allesinsluitende besoldiging van £120 per jaar.

Applikante moet volledige besonderhede van kwalifikasies meld. Dienste moet so spoedig moontlik aanvaar word.

Die dienstermyn sal slegs vir een jaar vanaf datum van aanstelling wees.

Afskrifte van ‚Die Memorandum van Ooreenkoms' betreffende die voorwaardes van aanstelling kan van die ondergetekende verkry word. Aansoeke in verseëlde koeverte gemerk ‚Gesondheidsbeampte' moet die ondergetekende nie later dan Vrydag 6 Augustus 1954 bereik nie.

Stemwerwing by Raadslede sal 'n diskwalifikasie wees.

W. H. Harmsen
*Stadsklerk*

Posbus 2
Frankfort

## Provincial Administration of the Cape of Good Hope

### UNIVERSITY OF CAPE TOWN: JOINT MEDICAL STAFF FOR GROOTE SCHUUR AND OTHER TEACHING HOSPITALS

### VACANCIES

1. Applications are invited from registered Medical Practitioners (registered Specialists) for appointment to the following posts:

*Department of Pathology*

1 full-time post of Medical Practitioner, Grade D, with salary on the scale £1,200x50—1,500 per annum.

*Department of Venereology*

1 part-time post of Medical Practitioner, Grade F, salary £164 per annum per session—one session.

2. The conditions of service are prescribed in terms of Hospital Board Service Ordinance No. 19 of 1941, as amended, and the regulations framed thereunder.

3. A cost of living allowance at rates prescribed from time to time by the Administrator is payable to whole-time officials and employees.

4. The Joint Medical Staff is required to serve jointly the Provincial Administration of the Cape of Good Hope and the University of Cape Town.

5. Candidates for the post of Medical Practitioner, Grade D, Department of Pathology must be registered specialists in the speciality in which the vacancy exists.

6. Candidates for the post of Medical Practitioner, Grade F (part-time), Department of Venereology, must have not less than three years experience after registration as a Specialist in the Speciality in which the vacancy exists.

7. A session shall be four hours per week, not necessarily continuous clinical and/or teaching work.

8. Application must be made on the prescribed form, Staff 23, which is obtainable from the Director of Hospital Services, P.O. Box 2060, Cape Town, or from the Medical Superintendent of any provincial hospital or Secretary of any School Board in the Cape Province.

9. The completed application forms must be addressed to the Director of Hospital Services, P.O. Box 2060, Cape Town, and must reach him not later than 14 August 1954. Candidates must state the earliest date on which they can assume duty.

M127227

## Provinsiale Administrasie van die Kaap die Goeie Hoop

### UNIVERSITEIT VAN KAAPSTAD: GESAMENTLIKE MEDIESE PERSONEEL VIR GROOTE SCHUUR EN ANDER OPLEIDINGSHOSPITALE

### VAKATURES

1. Aansoeke word ingewag van geregistreerde Geneeshere (geregistreerde Spesialiste) vir aanstelling tot die volgende poste:

*Departement van Patologie*

1 voltydse pos van Geneesheer, Graad D, met salaris volgens die skaal £1,200x50—1,500 per jaar.

*Departement van Veneriese Siektes*

1 deeltydse pos van Geneesheer, Graad F—salaris £164 per jaar per sessie—een sessie.

2. Die diensvoorwaardes word voorgeskryf ingevolge die Ordonnansie op Hospitaalraadsdiens no. 19 van 1941, soos gewysig, en die regulasies wat daarkragtens opgestel is.

3. 'n Lewenskostetoelae teen bedrae wat van tyd tot tyd deur die Administrateur vasgestel word, is aan voltydse beamptes en werknemers betaalbaar.

4. Van die Gesamentlike Mediese Personeel word vereis om die Provinsiale Administrasie van die Kaap die Goeie Hoop en die Universiteit van Kaapstad gesamentlik te dien.

5. Kandidate vir die pos van Geneesheer, Graad D, Departement van Patologie, moet geregistreerde spesialiste wees in die spesialiteit waarin die vakature bestaan.

6. Kandidate vir die pos van Geneesheer, Graad F (Deeltyds), Departement van Veneriese Siektes, moet nie minder as drie jaar ondervinding na registrasie as 'n Spesialis in die Spesialiteit waarin die vakature bestaan, opgedoen het nie.

7. 'n Sessie is vier uur per week in verband met kliniese en/of opleidingswerk, maar is nie noodwendig onafgebroke nie.

8. Aansoek moet gedoen word op die voorgeskrewe vorm (Staf 23) wat verkrygbaar is by die Direkteur van Hospitaaldienste, Posbus 2060, Kaapstad, of by die Mediese Superintendent van enige provinsiale hospitaal of by die Sekretaris van enige skoolraad in die Kaapprovinsie.

9. Die ingevulde aansoekvorms moet aan die Direkteur van Hospitaaldienste, Posbus 2060, Kaapstad, gerig word en moet hom uiters op 14 Augustus 1954, bereik. Kandidate moet die vroegste datum meld waarop hulle diens kan aanvaar.

M127227

---

## Town Council of Westonaria

### VACANCY: PART-TIME MEDICAL OFFICER OF HEALTH

Applications are hereby invited from suitably qualified and fully bilingual persons for the position of Part-Time Medical Officer of Health at a salary of £360 per annum, and £75 per annum locomotion allowance.

Applicants must be fully qualified Medical Practitioners and the successful applicant will be required to enter into a written agreement in which his duties are fully described with the council.

A copy of this agreement will be available for inspection at the office of the Town Clerk/Treasurer, during normal office hours.

Sealed applications stating age, qualifications, experience and marital status and the earliest date on which duties can be assumed must reach the undersigned not later than 12 noon on Friday 6 August 1954.

Personal canvassing for appointment in the gift of the council is strictly prohibited, and corroborated proof thereof will disqualify a candidate.

W. J. R. Appelcryn
*Town Clerk/Treasurer*

Municipal Offices
Westonaria
5 July 1954
No. 13/1954

## Stadsraad van Westonaria

### VAKATURE: DEELTYDSE GENEESKUNDIGE BEAMPTE

Aansoeke word hiermee ingewag van behoorlik gekwalifiseerde ten volle tweetalige persone vir die betrekking van Deeltydse Geneeskundige beampte teen 'n salaris van £360 per jaar en 'n vervoertoelae ten bedrae van £75 per jaar.

Applikante moet ten volle gekwalifiseerde Mediese Praktisyns wees, en van die suksesvolle applikant sal verwag word om 'n skriftelike ooreenkoms waarin sy dienste volledig uiteengesit word met die stadsraad aan te gaan. 'n Afskrif van hierdie ooreenkoms sal gedurende normale kantoorure in die kantoor van die Stadsklerk/Tesourier ter insae beskikbaar wees.

Verseëlde aansoeke waarin vermeld word ouderdom, kwalifikasies, ondervinding, huwelikstaat, en die vroegste datum waarop dienste aanvaar kan word, moet ondergetekende nie later as 12 uur middag op Vrydag 6 Augustus 1954 bereik nie.

Persoonlike stemwerwing vir aanstelling in diens van die raad, is streng verbode, en voldoende bewys daartoe sal enige kandidaat diskwalifiseer.

W. J. R. Appelcryn
*Stadsklerk/Tesourier*

Munisipale Kantore
Westonaria
5 Julie 1954
N 13/1954

## Town Council of Vanderbijlpark

**STAFF VACANCIES: PART-TIME MEDICAL OFFICER OF HEALTH AND PART-TIME CLINICAL MEDICAL OFFICER**

Applications are invited from bilingual qualified persons for the following positions in the Council's service:

(*a*) Part-time Medical Officer of Health at a salary of £400 nett. per annum.

Applicants must be in possession of the Diploma in Public Health. The successful applicant will be required to devote at least ten hours per week to the Council in addition to any time for the purpose of attending meetings of the Council.

(*b*) Part-time Clinical Medical Officer at a salary of £400 nett. per annum.

The successful applicant will be required to carry out part-time clinical duties in the Council's Non-European Clinic, District N.W.2, and will have to devote at least ten hours per week to these duties.

The successful applicants for both positions will be required to enter into contracts of service, which will embody the actual hours of duty and conditions of service.

Further particulars in connection with the abovementioned positions may be obtained from the undersigned.

Applications, giving full details of qualifications, experience, age and the earliest date on which duties can be assumed, will be received by the undersigned up to noon on Monday, 9 August 1954.

Personal canvassing of Councillors for appointment in the gift of the Council is strictly prohibited. Corroborated proof thereof shall disqualify a candidate for appointment.

P. R. Nell
*Town Clerk*

P.O. Box 3
Vanderbijlpark
7th July 1954
Notice No. 30/1954

## Town Council of Brakpan

**VACANCY: DEPUTY MEDICAL OFFICER OF HEALTH**

Applications are invited from bilingual persons under 45 years of age for appointment to the undermentioned position. The successful applicant will be required to serve a probationary period of six months and, on confirmation of appointment will be required to join the Joint Municipal Pension Fund. The appointment will also be subject to a medical test of good health. In addition to the salary a Cost-of-living allowance will be paid in accordance with the Council's Scheme, and a locomotion allowance of approximately £10 per month, and the successful applicant will have to provide his /her own motor car.

The commencing notch on the salary grade will not necessarily be the minimum of the grade, but depending upon qualifications and experience, the appointment may be on a higher notch.

The duties attached to this post will be such as are allotted to the incumbent from time to time, and will include administrative public health duties, the conduct of the Council's ante-natal, post-natal, child welfare, tuberculoses and venereal diseases clinics for Europeans and Non-Europeans, and the examination of native males before the registration of service contract.

Applications stating age, experience and qualifications must be submitted on the official form obtainable from the Town Clerk's General Office, and must reach the Office of the Town Clerk, Municipal Offices, Brakpan, not later than 12 noon, Friday, 27 August 1954.

Canvassing for appointment either directly or indirectly will disqualifiy a candidate.

W. P. Dormehl
*Town Clerk*

Notice No. 51
Municipal Offices
Brakpan
2 July 1954

**PUBLIC HEALTH DEPARTMENT**

**DEPUTY MEDICAL OFFICER OF HEALTH**

Salary Scale: £1,000x50—£1,200 per annum.

Applicants must be registered with the S.A. Medical and Dental Council as general practitioners, and be in possession of a Diploma in Public Health or similar qualification.

## Stadsraad van Vanderbijlpark

**PERSONEELVAKATURES: DEELTYDSE GENEESKUNDIGE GESONDHEIDSBEAMPTE EN DEELTYDSE KLINIESE GENEESKUNDIGE BEAMPTE**

Aansoeke word ingewag van bevoegde tweetalige persone om die volgende betrekkings in die Raad se diens:

(*a*) Deeltydse Geneeskundige Gesondheidsbeampte teen 'n salaris van £400 netto per jaar.

Applikante moet die Diploma van Openbare Gesondheid besit. Van die suksesvolle applikant sal vereis word om behalwe vergaderings van die Raad wat hy bywoon, ten minste tien uur per week aan die sake van die Raad te bestee.

(*b*) Deeltydse Kliniese Geneeskundige beampte teen 'n salaris van £400 netto per jaar.

Van die suksesvolle applikant sal vereis word om deeltydse kliniese dienste in die Raad se Nie-blanke Kliniek, Distrik N.W.2, te onderneem, en om ten minste tien uur per week daaraan te bestee.

Van die suksesvolle applikante om beide betrekkings sal verwag word om dienskontrakte, wat die werklike diensure en diensvoorwaardes sal beliggaam, aan te gaan.

Nadere besonderhede in verband met bovermelde betrekkings kan van ondergetekende verkry word.

Aansoeke, waarin volle besonderhede van kwalifikasies, ondervinding, ouderdom en die vroegste datum van diensaanvaarding vermeld word, sal tot 12-uur Maandagmiddag, 9 Augustus 1954, deur ondergetekende ontvang word.

Niemand mag persoonlik invloed werf met die doel om aangestel te word nie; 'n kandidaat wat hom hieraan skuldig maak, kom nie vir die betrekking in aanmerking nie.

P. R. Nell
*Stadsklerk*

Posbus 3
Vanderbijlpark
7 Julie 1954
Kennisgewing Nr. 30/1954

## Provincial Administration of the Cape of Good Hope

**HOSPITALS DEPARTMENT**

**JOINT MEDICAL STAFF: VACANCIES**

1. Applications are invited for the undermentioned vacant posts of Medical Practitioner on the Joint Medical Staff of the Groote Schuur Hospital.

2. The conditions of service are prescribed in terms of the Hospital Board Ordinance, No. 19 of 1941, as amended, and the regulations framed thereunder.

3. Applications should be submitted (in duplicate) on the prescribed form, Staff 23, which is obtainable from the Director of Hospital Services, P.O. Box 2060, Provincial Building, Wale Street, Cape Town, or from the Medical Superintendent of any Provincial Hospital or Secretary of any School Board in the Cape Province. The closing date for the receipt of applications is 4 August 1954, and applications should be addressed to the Medical Superintendent, Groote Schuur Hospital, Observatory, Cape.

| *Department* | *Post* |
|---|---|
| General Surgery: | 1 post Medical Practitioner Grade B. |
| General Surgery: | 1 post Medical Practitioner Grade A. |

Initially for duty in the Casualty Department.

The following are the emoluments of the abovementioned posts:

Grade 'B': £720x40—£960 per annum.
Grade 'A': £500—600—660—£720 per annum.

In addition a cost of living allowance is payable at present at the rate of £320 per annum to married officials and £100 per annum to single officials.

*Qualifications Required*

Grade 'B': Not less than three years' experience after graduation or two years' experience after registration.

Grade 'A': Up to and including three years' experience after graduation or two years' experience after registration.

S24570

Printed by National Commercial Printers, Elsies River, and Published by the Proprietors, *The Medical Association of South Africa*, Medical House, 35 Wale Street, Cape Town. P.O. Box 643. Telephone 2-6177. Telegrams: 'Medical'.